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Volume XII, Number 4 October, 1958

PRINTED BY COLUMBIA UNIVERSITY PRESS, NEW YORK, N.Y.

Traffic Quarterly

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Published quarterly by the Eno Foundation at Saugatuck, Conn., issue for October 1958. Printed in U.S.A. Library of Congress catalog card: 50–1781.

Parking

Everyone looks with great expectation toward the benefits of the planned federal highway system. Notwithstanding this welcome for a national program of needed road building, many deplore our lack of concern over the other nation-wide part of the problem—parking.

Inadequate space for parking has become a hindrance to efficient motor travel, an obstruction to safe and full use of our streets. These conditions have far-reaching effects far beyond inconvenience to the motorist.

While automotive transportation is a boon to the growth, wealth, and health of our country, our failure to provide appropriate means for its fullest and convenient use leads to many unforeseen consequences for which we are not fully prepared. These occur in commerce, transportation, business, trade, and traffic.

Motor travel and parking are inseparable.

Because of many and varied requirements, the problem of providing suitable parking space may prove more difficult than a comparable provision of adequate roadways. Any anomalous procedure that provides one without the other is, at best, only half an answer. Our approaches toward solving our predicament—roadways versus parking space—are characterized by a centralized agency guiding road-construction while parking depends on a hodge-podge of well-meant but indiscriminate effort.

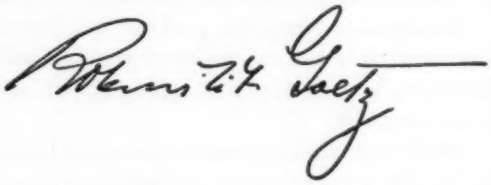
Many cities are best known for their chronic traffic confusion and the disorganized search for a place to park. In seeking a cure for this constant plague, cities face many perplexities solved only by well-informed and resolute effort. Insufficient funds seldom constitute a reasonable excuse for tolerating inadequate parking. Why have so many cities failed to initiate some worth-while official procedure toward relief? The problem is too serious for any city official to be casual about it.

It is unimaginable that any act on his part in a thriving community could be more highly regarded or rewarded than his diligent attention to this perplexing problem. Outstanding examples exist where lack of foresight and provident care have led to city blight and

deterioration. At this stage, corrective measures are difficult and compounded.

Other cities are incited to action by pride and courage. Without aid or funds they firmly face the problem with intelligent efforts that make commendable progress.

These are the cities and smaller towns where responsive and efficient city administration prevails.



Ten Year Traffic Trends

JAMES S. BURCH

Mr. Burch has been Planning Engineer for the North Carolina State Highway Commission for the last twenty-one years. He handles highway planning surveys, research projects, needs studies, planning and programming, mapping and traffic studies. He has had thirty-five years of experience in highway and traffic engineering. He has made traffic planning studies of forty-two North Carolina cities. He is a member of the American Society of Civil Engineers, of the North Carolina Society of Engineers, of the National Highway Research Board, and of the Institute of Traffic Engineers.

ACROSS the nation in the last ten years, highway traffic engineers and officials have witnessed an unprecedented up-surge in traffic demand. It has generally doubled—a fact that is almost wholly accountable for the obsolescence and inadequacy so prevalent in highways, roads, and streets.

During the late years of World War II, everyone recognized the pent-up demand for cars, gasoline, and tires, and expected greatly increased traffic volumes in 1946 and 1947. The increase developed as expected.

What was not fully anticipated was that the increase would continue at rates and to levels higher than anyone then imagined. During this period, growth rates of eight percent to twelve percent each year became commonplace. A 100 percent increase in ten years was observed in most sections. During the same period the population of the nation grew only about fifteen percent, and the majority of this population growth was among babies and children too young to drive.

Many serious, basic questions faced highway officials and engineers in their planning. How long could such traffic growth rates continue? When would the growth curve return to the traditional four percent or five percent annual growth rate? What economic factors were supporting this abnormal growth? With so many highways and streets obsolete and inadequate, how could logical plans be drawn to provide traffic facilities adequate for the subsequent

fifteen or twenty years? Would the growth curve turn abruptly downward? This was a period in which all the usual methods of traffic forecasting proved to be unreliable. Indeed, the expression "normal traffic growth" ceased to have any meaning.

This was also the golden era for the toll turnpikes in areas where the public traveler demanded better highways than the public taxpayer would provide—albeit the gasoline taxpayer was usually the same individual as the traveler. During the latter years of the decade, the Congress recognized the demand and set in motion the expanded 1956 Federal Highway Program. The fulfillment of this program is now taxing the best efforts of all the state highway departments and highway contractors. The greatest peacetime construction program in history is now in full swing.

In late 1957, those who had followed traffic trends for years observed a pronounced reduction in the rate of climb. Indeed, flat spots and reductions were noted in the traffic curve in many states. First, there was the erratic stock market activity and break in values in October. Then the advent of Russia's Sputnik seemed to have an adverse psychological effect on travel demand, and finally there developed the recession of the 1957–1958 winter and spring.

Traffic flow did not increase generally during this seven or eight month period, and showed appreciable reductions in many states. This flattening of the growth curve marked the end of a very pronounced ten-year traffic cycle and provided answers to many of the questions listed above.

A backward look at these trends may be of value in penetrating the uncertainties of the traffic future. The writer sent questionnaires to the state highway planning engineers in eleven southeastern states, requesting data on traffic growth factors for the ten years, 1948–1957.

Vehicle Miles of Travel

The nature of the data requested was the total vehicle-miles of travel each year on primary highways outside cities in all these individual states. Where these specific data were not available, similar data were obtained such as on total system travel, total travel on all roads and highways, total gasoline consumption, etc. Data were also requested on state motor vehicle registration and estimated

population. Significant comments were also solicited. The resulting data were tabulated, analyzed and studied as discussed below.

Perhaps Table I reflects the most significant data. Traffic grew from 59 percent to 114 percent in the several southeastern states during the nine-year period 1948–1957. With few minor exceptions, a seventy-four percent traffic growth was noted in all these states. The weighted average traffic growth was eighty-nine percent.

Table I

ELEVEN SOUTHEASTERN STATES

Ranked According to Traffic Growth Rates

ALSO SHOWING MOTOR REGISTRATION GROWTH RATES

	Traffic Growth Rate: 1948=100 percent		*Motor Vehicle Registration Growth Rate*
	1957	*1956*	*1948–1956*
1. Florida	214%	199%	228%
2. Georgia	202	196	178
3. Alabama	195	187	200
4. Louisiana	194	186	195
5. North Carolina	179	175	179
5. Kentucky	179	165	174
6. Virginia	177	168	171
7. Tennessee	174	162	168
7. South Carolina	174	170	167
8. Arkansas	171	171	156
9. Mississippi	159	148	165
Total	189%	180%	182%

For the eight-year period 1948–1956 the growth was eighty percent. This compares with nationwide increases during the same period of sixty-one percent on rural main highways, as noted in "Public Roads." Probable reasons are discussed later.

Other data were obtained on business volume in the South from the "Blue Book of Southern Progress" (Manufacturers Record), for the years 1949–1957. Business volume in the South grew by eighty-five percent, as compared to eighty percent in the nation. It was also noted that there was a general trend relationship between traffic growth and business volume in the South as noted below. (Business volume, being expressed in dollars, included the effect of inflated values, while traffic data were based on actual counts.)

Table II

EIGHT-YEAR GROWTH PERCENTAGE[1]

	Traffic 1948–56	*Business Volume 1949–57*
Florida	99	120
Georgia	96	96
Alabama	87	82
Louisiana	86	87
North Carolina	75	100
Arkansas	71	52
South Carolina	70	60
Virginia	68	68
Kentucky	65	80
Tennessee	62	85
Mississippi	48	59
11 Southern States	80	85
United States	61[2]	80

1. Identical year group data not available.
2. 1948–1956, eight years, as noted in "*Public Roads*," Main Rural Roads.

An exact comparison between data for two slightly different eight-year periods is not to be expected. There are also many types of business and industry where growth would not be necessarily related to traffic increase. It does appear, however, that traffic was growing substantially with business. Probably traffic would have far exceeded the business growth, had highway-street facilities been adequate. These were peak years for street and highway buses, as well as for scheduled aviation. Both show phenomenal rates of growth, restraining motor vehicle use.

Motor Vehicle Registration

The expanding ownership of motor vehicles in the South is revealed from the following data on growth of motor vehicle registration, as compared to traffic growth, both being for the eight-year period 1948–1956 in percentage.

Because of varying state laws and rates for licenses, reciprocity, etc., registration data are not always directly comparable. The growth of eighty-two percent in eleven southern states, however, exceeded the growth in the nation of fifty-nine percent. In almost all cases, the registration growth exceeded the traffic growth: Un-

Table III

PERCENTAGE OF GROWTH IN TRAFFIC AND REGISTRATION

	Increase over 1948	
	Traffic	*Registration*[1]
Florida	99	128
Georgia	96	78
Alabama	87	100
Louisiana	86	95
North Carolina	75	79
Arkansas	71	56
South Carolina	70	67
Virginia	68	71
Kentucky	65	74
Tennessee	62	68
Mississippi	48	65
11 Southern States	80	82
United States	61	59

1. Sources: "*Highway Statistics-Summary to 1955*" and "*Highway Statistics-1956.*" U. S. Bureau of Public Roads.

doubtedly due to (1) the increase of two-car families, (2) the longer service life of the modern motor vehicle, (3) the growing use of trucks, and (4) suppressed growth in total traffic, due to inadequate highways and streets, and airplane travel.

Increased Motor Vehicle Ownership

In the South in 1948, there were 213 vehicles per 1,000 persons. In 1957, there were 357 per 1,000, or one registered vehicle for every 2.8 people. Not only was this a sixty-eight percent increase; it could be said that everybody could now ride at once, and only use the front seat. There are weekends when it seems that this has literally occurred.

One wonders whether the public can absorb and efficiently use substantially more cars and trucks. Granting that population and registration will grow, will the 2.8 ratio ever be materially reduced in a wide region? The recent trend would indicate a negative answer. With scheduled and private aviation each year absorbing more of the long-trip travel demand, and with the parking problem limiting urban traffic growth, it is not likely that per-capita owner-

ship of motor vehicles will increase greatly, especially when one considers the appreciable annual cost of motor vehicle ownership and operation. At this writing, one may not observe any price reductions in cars, fuel, tires or accident insurance. Indeed, the car is a significant part of the average family's total budget.

Automobile production has finally exceeded demand, and labor unions in this industry are—for the first time—working without a new contract. These developments occurred simultaneously with the end of the abnormal post-war traffic growth cycle.

The Two-Car Family

A substantial percentage of the increase in post-war motor vehicle ownership may be accounted for by the greatly enlarged proportion of families who have two or more cars. A high percentage of families are now in this category. It does not follow, however, that such ownership increases the total travel per family.

Indeed, one of the reasons for multiple car ownership is to avoid unnecessary travel in the daily comings and goings of various members of the family. Reliable data now available show that, for the last few years, we have had an actual reduction in vehicle-travel and gasoline consumption. Total travel is related, not so much to motor vehicle registration, as it is to the following four factors:

Total population of driver age; individual time available for travel; net individual income in excess of cost of living, and freedom from traffic congestion in urban areas.

The fact that the family yard and driveway are now full of cars does not result in more travel per car, but in less.

Southern State Characteristics

Great basic changes have occurred in the South within the last twenty to thirty years. Those who consider the South as the mint julep, showboat, fatback area are misinformed.

A recent survey by the United States Department of Commerce shows that the seven southeastern states' area doubled its manufacturing pace in the eight years 1949–1956 and moved into fourth place among regions of the nation, thereby displacing New England.

The 100 percent increase in this group of states compares with the national average of eighty-five percent for the same period. North Carolina led individual states in the group with production valued at $17.2 billion.

Originally based almost solely on the growth of basic crops, such as cotton, tobacco, and rice, the South has grown in terms of industry, commerce, processing and distribution to the point where it is well above that in the average state, and far greater than in many areas. Its great growth and economic strength lie in diversification: its welfare is no longer dependent upon a single or upon several basic segments of the economy.

Advantages of this diversification are reflected in the unusual growth characteristics in traffic, motor vehicle ownership, and travel-growth in the South as compared to that of the nation. It will be recalled that the southern traffic growth from 1948 to 1956 was eighty percent as compared to only sixty-one percent in the nation as a whole.

What of the Future?

Forecasting is recognized as a precarious business. However, one of the requirements of the Federal Aid Highway Act of 1956 was that each of the states would predict traffic demands to 1975, as a basis for location, design, and cost features of needed traffic facilities built to last at least twenty-five years and initially adequate for the traffic of 1975. This requirement for forecast involved elaborate and extensive studies by the highway planning survey engineers in each of the states. The writer, one of these, after forecasting, compared notes with engineers in the other southern states.

These studies, independently made, resulted in the expectation that total motor vehicle travel would increase in southern states by from 70 percent to 100 percent between 1955 and 1975. While this anticipated growth is not so great as that experienced during the recent decade, it nonetheless portends a significant increase. The basic reasons for this increase are related to growth in population, more than to any other single factor.

Certain facilities, especially the interstate expressways, probably will lead all others in traffic growth because of their capacity and mutual support and interaction in relation to land-use, industrial

growth, population attraction, and attendant traffic generation.

The primary highway system and the arterial urban streets will develop substantial increases in traffic demand. Their capacity will determine their level of traffic service. Except on expressways with reserve capacity, vehicular movement in the traffic-saturated central business districts of cities will likely grow but little more. Mass use of street buses appears to be the ultimate solution for traffic service in these areas.

It is believed that the average highway trip length will continue to be relatively short, i.e., less than thirty-five miles. It is also believed that prevailing rural speeds will increase little above their present fifty to fifty-five MPH overall average, even though design speeds are higher, legal limits may increase, and the driver could voluntarily choose speeds higher than now prevailing. Repeated observations show that the modern driver in the prevalent high-speed-high-horsepower car seldom wants to travel more than sixty MPH, even on excellent, adequate highways.

It appears that the growth in size and weight of tractor-truck-semi-trailers has become stabilized, and that the present combination may be expected to continue with its prevailing basic weight-size characteristics for a great many years to come.

Finally, the outlook for future traffic growth, in terms of vehicle miles in the majority of the states, may be about three-and-a-half percent a year. Even so, highway and street officials face almost insurmountable problems in their efforts to bring existing facilities up to current traffic needs, and keep pace with growing demands in the years to come. Even a three-and-a-half percent a year growth means a 100 percent increase in thirty years.

The greatest, most expensive of these problems remains in and near urban areas where congestion is at its worst, where there is no unused space for expressway street construction, and where costs for such facilities begin at a million dollars a mile.

Although the post-war up-surge in traffic demand has been replaced by a more rational growth rate, it will take everything we have for the next twenty years to bring our traffic facilities up to the point of general adequacy and public satisfaction. The question of how to do it is squarely before us. We can begin no sooner than now to find the answers.

City Planning and Expressways

HAROLD MACLEAN LEWIS

Mr. Lewis is a consulting engineer and city planner with thirty-five years' experience in city and regional planning, zoning, and studies of highway, traffic, parking, and other urban and regional problems. Among his recent assignments was the rezoning of the national capital. He is a member and past president of the American Institute of Planners and a member of the American Society of Civil Engineers and the American Institute of Consulting Engineers. He is a licensed professional engineer in New York, New Jersey, and Delaware.

CONSTRUCTION of the interstate expressways is creating both opportunities and problems for urban and rural planning and zoning agencies. Urgency in placing these highway plans under construction to meet the goal of 41,000 miles in thirteen years —two already have passed—increases the problem.

While city planning has been in operation in many municipalities, few have adopted thoroughfare plans that will supply a positive answer as to the best location, or as to arterial connections to enable traffic to move freely between expressways and urban centers. A large proportion of the rural areas through which these routes will pass are without any protective zoning or any comprehensive land-use plan. Even where these exist, they will need to be restudied to prevent haphazard development along the new highways.

Our best engineering talent is being marshalled in the design of these inter-state routes. Firms employed are necessarily limited to those with large staffs equipped to handle expeditiously the multitude of design problems. There is neither place nor time to precede the location studies by such city and regional plans as would assure a full consideration of sound planning principles.

The only way existing city plans can be effectively brought to bear upon the problem is by effective co-operation between the local planning agencies and the state highway departments that handle the design contracts. This is not likely to happen unless the planning commissions take the initiative and unless they are broad-minded enough to look at the problem from a regional rather than local point of view. Too often their attitude may be: Put the highway

somewhere else so long as you don't come through our community.

The problem is thus one of stepped-up city planning and zoning, close co-operation between planning agencies and state highway departments, and a broad and unselfish viewpoint for everyone concerned. In the necessary studies there are many factors to be considered, several of which will be discussed briefly below.

Relation to Urban Street Systems

Some of our large metropolitan cities had already developed expressway systems free from any grade crossings, and many states had completed expressways or turnpikes. In many cases major problems will arise in the co-ordination of the new system with any existing expressways and urban street patterns.

In general, the new expressways will go through the edges of large incorporated municipalities and completely bypass the small ones. Connections with existing street systems, in each case without any left-turns on the expressways and generally without such turns on local streets, will occur at a limited number of points. Selection of these points will determine the downtown approach routes which, in many cases, may not be able to handle resulting traffic without widenings or other improvements.

As the expressways will carry both trucks and passenger vehicles, interchanges in residential areas create local problems of diverting truck traffic entering or leaving the expressways to routes where it will not adversely affect residential neighborhoods.

In some cases there will be obvious approach routes to which connections can be made, but this may prove to be the exception rather than the rule. In any event, where a city already has adopted a street thoroughfare plan, some adjustments to it are sure to be required. A progressive city planning commission must study these adjustments while the highway planning is still in its preliminary state if a satisfactory solution is to be worked out.

Frequently it may prove desirable to have an interchange connected with a pair of streets, each of which can be operated for one-way traffic, to avoid overloading a single street. Here again co-operation between the city and the designer of the expressway, through the state highway department, can prove helpful.

Cities have been studying the planning of their downtown business centers and such studies have invariably included proposals for offstreet parking facilities on the fringes of the retail and office centers. The Fort Worth and Baltimore plans are typical of such proposals for large cities. The planning commission of Wilmington, Delaware, adopted a master plan for its central business area in 1955 and the Wilmington parking authority has been making progress in providing the needed offstreet parking.

Parking Problems

Among smaller cities getting attention by their proposals are Springfield, Oregon, which converted its main street into a pedestrian mall for a test period of ten days; and Waukesha, Wisconsin, where an elaborate downtown plan has been sponsored by the Chamber of Commerce. Conversion of Main Street in Mooresville, North Carolina, to a pedestrian way was under official study in 1958.

The selection of those arterial routes which will have direct connections with the interstate expressways will result in a concentration of parking requirements where these routes enter the downtown area. Adjustments in any plan for offstreet parking facilities are sure to be needed. Where the concentration is great enough it may prove desirable to substitute multi-level garages for parking lots.

Upsetting of Land-Use Patterns

In the metropolitan areas the new expressways are certain to be used intensively by office workers. These will require all-day parking, which might well be provided in facilities separate from those designed primarily to serve the shopper and visitor, where a substantial turn-over of parking space during the day may be expected.

Any urban area will group itself into a pattern of residential neighborhoods; where urban land-use plans have been adopted, the boundaries of these neighborhoods are usually incorporated in such a plan. It is highly desirable that any interstate route crossing a municipality should not cut across these neighborhoods but should, where possible, follow along their boundaries. In some cases these boundaries will follow railroad rights-of-way, watercourses, bridges,

or other features, natural or man-made, which dictate their locations. In other cases boundaries may follow the line of demarcation between an apartment district and a one-family district or between a residential district and an industrial district.

Sometimes topography may dictate the location of the expressway and some adjustment in neighborhood boundaries, by revision of the land-use plan, may prove to be desirable.

Relation to Zoning

Closely related to the land-use plan, and more definite in its boundaries, is the zoning map of the municipality. Many such maps, particularly those for county or rural zoning, have looked toward the establishment of new industries in outlying areas where they can be developed at low-density on large sites. The new expressways, without any direct access from abutting property, cannot become cluttered with roadside industries or commercial uses but they are sure to promote the establishment of new industries that will be within relatively easy reach of the interchanges with local streets.

Where zoning is not in effect, a scrambled pattern of development is almost sure to follow. Where it is in effect, industry will be guided into proper locations, but the existing plan should be restudied to see whether the expressway will require some adjustment in industrial zoning.

Even more urgent is the proper control of roadside businesses which, being excluded from direct expressway access, are apt to spring up around interchanges. These will include automobile service stations, motels, refreshment stands, and other usual roadside services. The planning and zoning agencies should establish the most desirable locations for such uses and see that land is zoned accordingly. Certainly they do not belong at every interchange but only where they can be fitted into a reasonable pattern of residence, business, and industry.

Where it has proved possible to locate expressways along boundaries of residential neighborhoods or business and industrial districts, little change in the general zoning pattern should be necessary. In any event, the zoning map should be restudied to

make sure that any needed adjustments are taken care of. In some cases new apartment districts may be justified, particularly in those neighborhoods lying between the expressway and the downtown area.

Effect on Recreation Plan

Generally, consulting firms retained by the state highway departments have made their preliminary locations for the interstate routes on air maps of the area. These maps show clearly where the built-up areas are and what areas are still free from development. They do not show the use of these open areas.

Some preliminary locations have taken the most direct routes with little regard to their effect upon the local community. In other cases they appear to have utilized any open spaces that appeared on the maps without any detailed study as to their present use or that for which they are most suitable.

In the former case, local municipalities have objected strenuously to the cutting up of their community and have requested locations either along their boundaries or in adjoining municipalities. In the latter case, it has sometimes developed that the proposed locations have cut directly across parks and playgrounds, threatening irreparable damage to the recreation system of the municipality.

In such situations the local park commissions have registered strong objections. It has been pointed out that parks as well as improvements have great value and are often less replaceable. In one case, it has been proposed to develop some new recreation facilities within the landscaped borders of the expressway right-of-way.

Through the co-operation of park commissions and city planning commissions it should be possible, through comprehensive planning, to expand the recreation facilities of a municipality, using such facilities as partial buffers between the expressway and adjoining residential areas.

Effect on the Tax Structures

Inevitably the acquisition of wide rights-of-way for expressways will take both lands and buildings off the tax rolls. In metropolitan areas, demolition of a number of structures may prove unavoidable.

Where homes are involved, objectors are most vociferous. It is this feature that has made difficult an agreement on final locations in urban areas, in some cases resulting in court action in attempts to prevent the construction of the highway or to push its location into suburban areas without regard to the resulting inefficiency in providing downtown access or the increased difficulty and cost of widening local streets to handle approach traffic.

There is a substantial amount of evidence to show that the construction of expressways, particularly where they are depressed beneath existing streets and the rights-of-way are wide enough to establish landscaped borders, has had little deleterious effect on abutting improvements and has often increased land values.

Naturally a person whose home or place of business is to be taken by the project feels aggrieved and is worried that he may not receive a fair price for his property. Procedures established in most states have assured that he will be fairly compensated and many individuals have taken the unselfish attitude that the general welfare is more important than their own problem. It is the small minority that is most evident at public hearings and makes the most noise.

Municipalities should make a fair appraisal of potential increases in value of abutting land, which may much more than compensate for the loss in taxable values as a result of the property acquired for a public use. Often these highway routes, and particularly the access routes constructed in connection with them, are being located through blighted areas and are eliminating obsolescence and uneconomic structures at much less cost to the municipality than is possible under the provisions of the United States Housing Act. That Act requires that municipalities pay one-third of the net loss of a slum clearance and redevelopment project while the federal-aid interstate highway system requires no municipal contribution.

Displaced Families

Public works have always resulted in some dislocation of families, requiring their relocation on other sites. The major relocation problem in urban areas has arisen from those urban renewal programs involving clearance and rebuilding of blighted residential areas.

The interstate highway system further aggravates this problem

wherever demolition of dwellings is required for their rights-of-way. This is, therefore, not a new problem but an aggravation of an existing one and its solution can best be handled by whatever municipal agency is dealing with the relocation of families displaced by redevelopment projects.

This machinery may be simplified if the highway plan can be co-ordinated with the programs for clearance and rebuilding of blighted areas, only parts of which may be taken by the highways, so that new housing or other improvements can be provided along the borders of the expressways. This may involve some public housing with some to be supplied by private redevelopment. New Haven, Connecticut, provides an example of a combination project in which an access highway is being constructed from its business center to the Yankee Turnpike which, although started prior to the planning of the interstate system, has been incorporated into that system.

Typical Procedure Followed

The various steps involved in the selection, planning, and execution of a federal interstate highway route are established by the United States Bureau of Public Roads, designated by Congress as its agent under the 1956 Act, and administered by a newly created office of federal highway administrator. A typical schedule of procedure includes the following nine steps:

1. Inclusion of the route by the U. S. Bureau of Public Roads, with a general description, as a part of the interstate system authorized by Congress under the federal-aid highway act of 1956.

2. Preparation of a preliminary study by a private engineering firm, under contract with the state highway department and working in close collaboration with that department.

3. Public hearings by the state highway department, with representatives of the Bureau of Public Roads present, at which alternative routes are presented and discussed on the basis of analyses made by the state's consultants.

4. Recommendation by the state highway department of a specific location to the Bureau of Public Roads.

5. Reaching of an agreement between the state highway department and the municipalities along the route.

6. Publication by the state highway department of the report of its consultants showing preliminary designs and estimates of the right-of-way costs and construction costs for the route recommended.

7. Approval by the Bureau of Public Roads.

8. Preparation of contract designs and specifications, by sections, of the route, each section allotted to a different engineering firm so as to make the best use of available engineering manpower.

9. Advertising for bids, leading to letting of contracts and actual construction.

As pointed out above, this procedure does not specifically provide for bringing into the picture the city planner or official planning commission in the area traversed by the route. Nevertheless, there is general agreement that the expressway should not unduly disrupt any existing city or regional plans and should give consideration to planning principles.

Under procedures established by the urban renewal agency for its approval of urban projects calling for clearance and rebuilding of blighted areas, reference to and approval by the local city planning commission is made a prerequisite of federal approval for any loan and grant contracts. Could such a requirement have been written into the 1956 highway act?

Because of the lack of any active planning agencies throughout much of the area traversed by the routes and the fact that, where there are active agencies, they generally are not well-enough financed to undertake promptly the necessary studies, the writer believes that such a requirement would have resulted in delays that would have seriously upset the program.

As it is, the influence of any planning agencies depends upon their own initiative and their support by their legislative bodies. To be effective, such initiative should be exercised at an early stage of the procedure. In most cases, state highway departments welcome suggestions by official planning agencies as their preliminary studies are undertaken. Legislative officials of municipalities concerned should consult with their local planning commission well in advance of any public hearings in the hope that they may thereby coordinate the thinking of the various municipal departments and present to the state highway department recommendations that conform with sound city planning.

Examples of the relationship of planning and zoning to the location of expressways are provided by the writer's experience in the District of Columbia and in Wilmington, Delaware. These are described briefly below.

The District of Columbia

The writer served as consultant to the District of Columbia in a comprehensive rezoning of the District which was adopted on April 25, 1958, based on the consultant's report submitted in November, 1956. As a part of his rezoning contract the consultant was required to carry out and incorporate in his report a series of planning studies to provide a firm basis for the revised zoning regulations and maps.

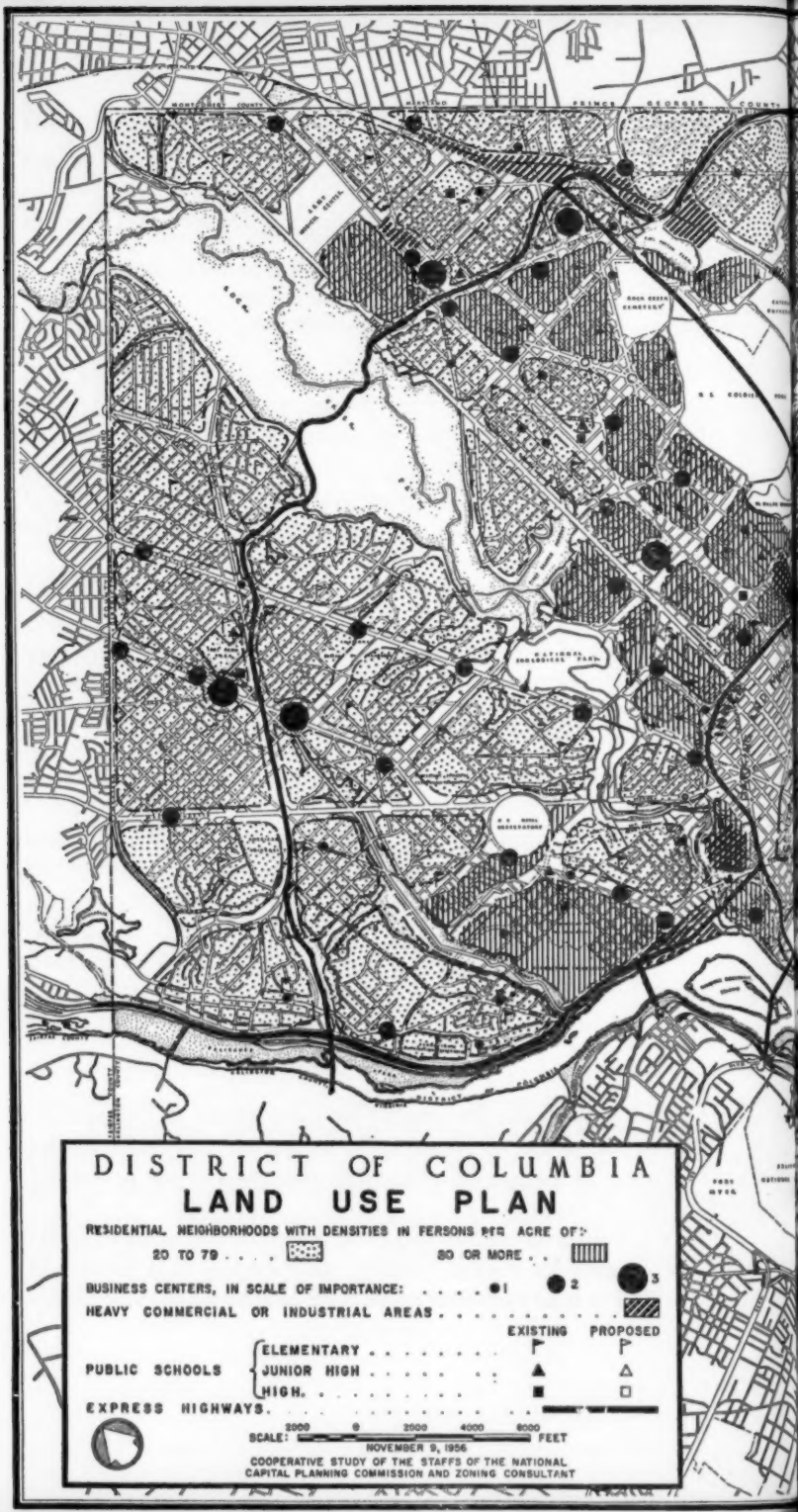
These included a land-use plan in which the area of the District was, for the first time, subdivided into residential neighborhoods the boundaries of which were co-ordinated with the expressway plan for the District, part of which had already been carried out.

This land-use plan, worked out in co-operation with the National Capital Planning Commission and the zoning consultant, delineated 137 residential neighborhoods classified in four density groups. A simplified presentation of this plan showing only two density groups (Figure 1) brings out the relationship of the neighborhoods to the expressway plan. One of the major expressway proposals shown thereon is an inner loop which will circumscribe the central business district, the area occupied by central government buildings, and a fringe area shown on the plan as best suited for parking and mixed occupancy.

Wilmington, Delaware

The difficulties and controversies that have arisen in connection with the development of Delaware's federal-aid interstate routes illustrate some of the special difficulties discussed in the preceding portions of this paper.

There are three interstate routes provided in the State of Delaware, designated as FAI–1, FAI–2, and FAI–3 and shown in Figure 2. FAI–1 is an east-west route from Maryland to New Jersey


DISTRICT OF COLUMBIA
LAND USE PLAN
RESIDENTIAL NEIGHBORHOODS WITH DENSITIES IN PERSONS PER ACRE OF:
20 TO 79 . . . .
80 OR MORE . .
BUSINESS CENTERS, IN SCALE OF IMPORTANCE: 1 2 3
HEAVY COMMERCIAL OR INDUSTRIAL AREAS . . . . . .
EXISTING PROPOSED
PUBLIC SCHOOLS
ELEMENTARY . . . . . P P
JUNIOR HIGH . . . . . ▲ △
HIGH . . . . . ■ □
EXPRESS HIGHWAYS . . . . . .
2000 0 2000 4000 6000
SCALE: FEET
NOVEMBER 9, 1956
COOPERATIVE STUDY OF THE STAFFS OF THE NATIONAL CAPITAL PLANNING COMMISSION AND ZONING CONSULTANT

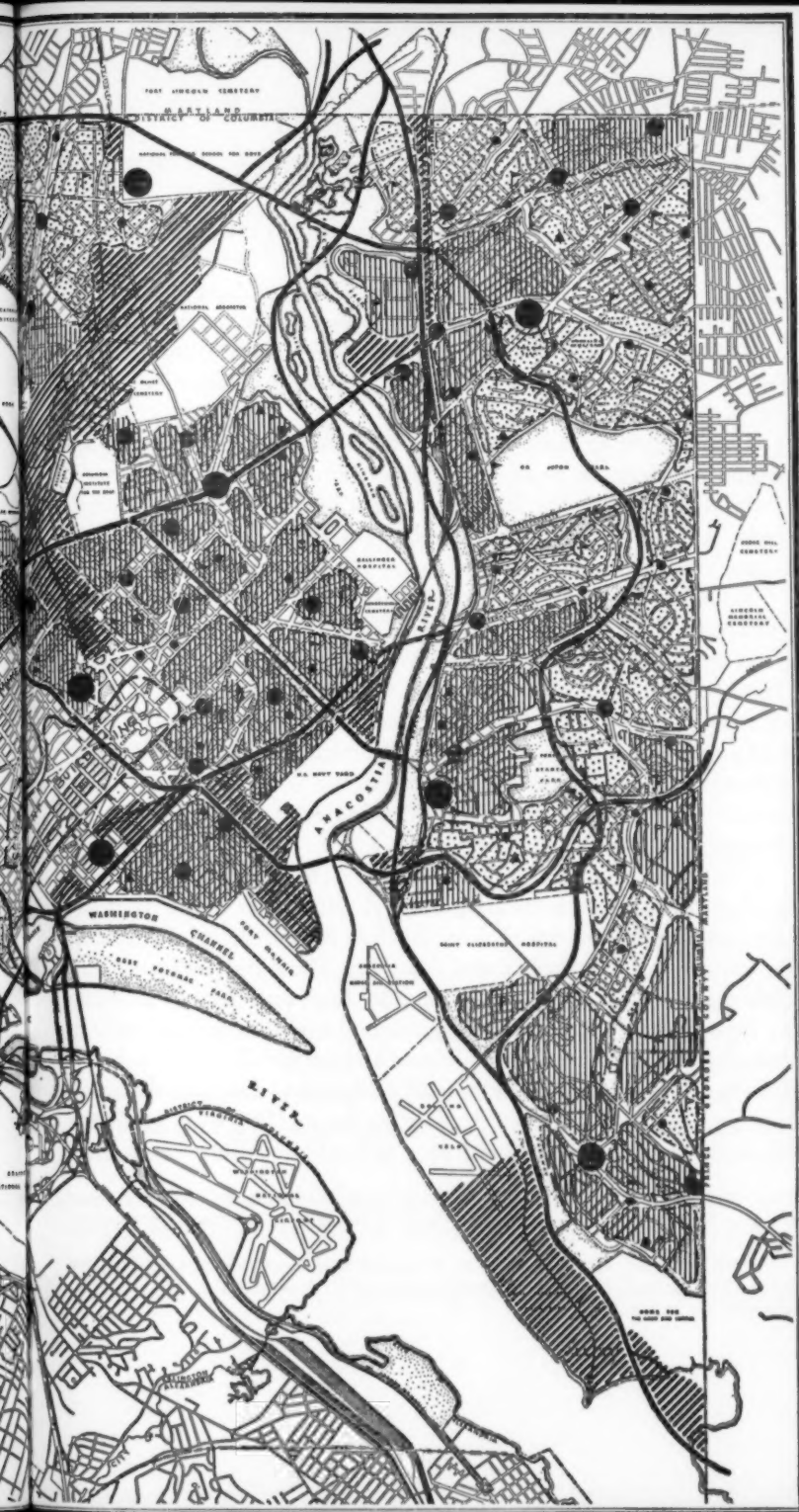

MARYLAND
DISTRICT OF COLUMBIA
ANACOSTIA
RIVER
WASHINGTON
CHANNEL
EAST POTOMAC PARK
WEST POTOMAC PARK
RIVER

Figure 1

and passes just south of the city of Wilmington to cross the Delaware River over the existing Delaware Memorial Bridge.

Connecting with this route at a point southwest of Wilmington are the other two routes. FAI–2 passes through the western developed residential sections of Wilmington and will serve both as a bypass for through-traffic and for commuter movement between Wilmington and a rapidly expanding suburban area; it was estimated that 80 percent of its traffic will have an origin or destination in the Wilmington Metropolitan Area.

FAI–3 skirts the eastern border of the city through largely undeveloped meadow areas and follows the shore of the Delaware River north of the city. It will be essentially a bypass for through traffic and is expected to carry a large percentage of trucks. Both routes join just south of the Delaware-Pennsylvania line.

Route FAI–1 aroused little controversy and was approved promptly, after public hearings held in February, 1957, and is already partly under construction. The other two routes are largely the outgrowth of a series of studies made by the Delaware state highway department over the last ten years. These started with an origin and destination survey for the Wilmington metropolitan area undertaken in 1948 in co-operation with the U. S. Bureau of Public Roads, the mayor and council of Wilmington, and the New Castle County levy court.

From the analysis of this material, the state highway department developed two expressway proposals: Route "A" running from the south edge of Wilmington, crossing the city a little to the west of the central business district, and extending along the Baltimore and Ohio Railroad to the Pennsylvania state line; and Route "B" passing through the marshy and undeveloped areas on the east side of Wilmington known as Cherry Island and connecting with existing state highways just north and south of the city.[1] Later in the same year preliminary plans and profiles for Route "A" were made for the state highway department by a firm of consulting engineers.[2]

1. "Report of the Wilmington Metropolitan Area Transportation Study—Arterial Route Analysis with Ultimate and Interim Plans," Delaware State Highway Department, 1950.

2. "Wilmington Metropolitan Area Arterial Route Analysis—General Plan, by Parsons, Brinckerhoff, Hall and Macdonald, Engineers," Delaware State Highway Department, December, 1950.

On February 13, 1957, the state highway department announced that it had approved a preliminary plan for FAI–2 crossing Wilmington eleven blocks west of the old Route "A". From then through March, the highway department representatives attended

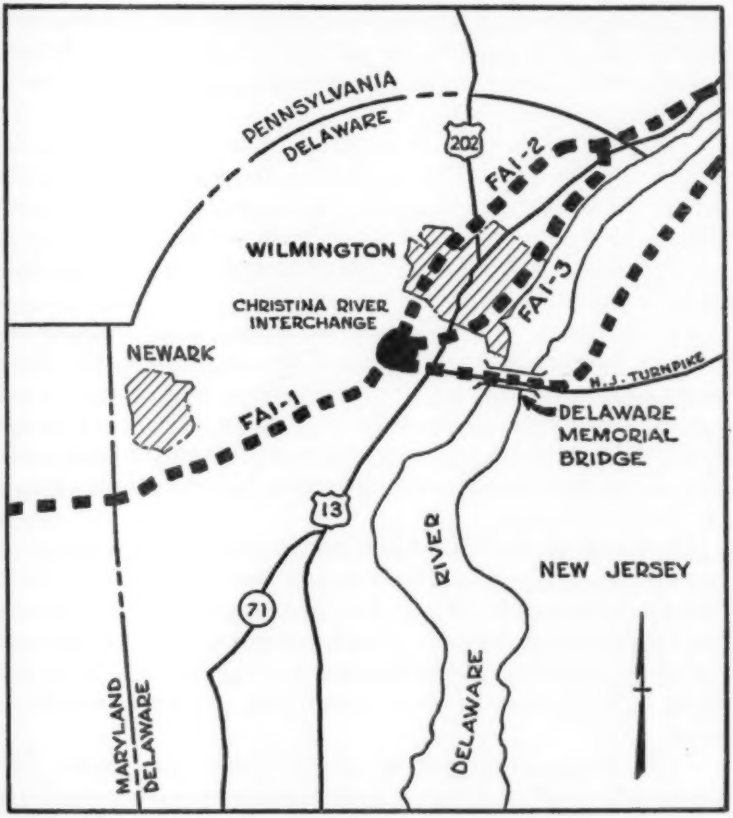


Figure 2. Location of Delaware Federal-Aid Interstate Routes.

numerous informal meetings with officials and citizen groups, both within and without the City of Wilmington, at which their proposals were explained and discussed.

Citizen opposition groups were promptly organized in Wilming-

ton urging that the route be kept outside and west of the city, and even questioning its need, provided FAI–3 were constructed. Residents along the route protested bitterly about the proposed taking of their homes and the president of the board of park commissioners pointed out that the project would destroy fifty-one acres of the city's 311 acres of park land and would run for two and one-tenth miles through park property; he claimed that the highway planners had selected their location because the highway could be built more cheaply on park property.

The board of directors of the street and sewer department approved the state proposal as a solution that would best serve the citizens of Wilmington as a whole. Citizen groups threatened court action. The highway department continued to send speakers to local meetings and its representatives also discussed their proposals with the Wilmington planning commission.

Public hearings were originally scheduled to start March 19, but were postponed at the request of the city council. The State Senate adopted on March 7 a resolution demanding more information on the economic effects of the route and a study of alternative locations. On March 13, the state highway department made public the figures on nine alternative locations, including the old Route "A" referred to above.

On March 14, the Wilmington Planning Commission approved the route in principle but urged careful study of alternative locations. On March 28 the Wilmington planning commission and the New Castle County regional planning commission jointly adopted resolutions endorsing a western freeway within the city limits but urging its location so as not to cut through residential neighborhoods.

Public hearings started April 10 and were long and noisy. The first was adjourned until the 13th and after the second hearing there was another adjournment. A new citizens' group, entitled Delaware Citizens for the Freeway, was organized to back the state's program. A third hearing was held on May 6 and a final hearing on May 7.

The highway department then reactivated the old Route "A" study and presented to the city council on June 13 comparative statistics for this route and three of its alternative studies to the west

thereof. While holding to its original recommendation, it stated it would accept any one of the four alignments. Council deferred action but on June 20 approved the Route "A" location that would pass between Adams and Jackson Streets about four blocks west of the central business area as delineated by the planning commission. Opposition boiled up again and an attempt was made to rescind the council action on June 27 but this was lost by a six to seven vote.

On June 24, the state highway department approved the Route "A" location and on June 28 a formal agreement was signed by city and state highway officials allowing the state highway department to build a six-lane freeway across the city along the Adams-Jackson Streets route. On the first of July there came into office a newly elected city council in which the former minority political party held complete control through 100 percent membership. In spite of their corporation counsel's advice that the approval of the former city council could not legally be rescinded, on July 19 the new council passed a resolution "condemning the unwarranted and hasty action" of the former council in approving the Adams-Jackson Streets route, on July 25 voted to rescind the former council's approval of June 20th, and on August 1 voted to rescind the former council's agreement of June 28th with the state highway department.

The mayor, in disagreement with the new council, has consistently maintained that the actions of the former council were binding; yet the council on September 5 voted to "hamper, hinder and obstruct" construction of an expressway along the approved alignment even if the city's contract with the state highway department were declared valid by the courts. The organized citizen opposition continued active through conferences with Delaware Congressmen and the U. S. Bureau of Public Roads.

In spite of this, the state highway department went ahead on the assumption that it had a valid contract with the city and held public hearings on the Adams-Jackson Streets route on September 23 following release of full information on September 19.

Gradually support for the state highway department plan then started to build up. On September 20 it was announced that the board of park commissioners had approved the route "provided an adequate and acceptable substitution in park land is received in

return" for any park property to be taken and they are "completely recompensed" for any damage or destruction of park land.

On October 2 the Wilmington Planning Commission adopted a resolution reviewing the history of the commission's actions on a western expressway and endorsing the Adams-Jackson Streets route. Representatives of the Delaware Citizens for the Freeways called on the federal highway administrator on October 7 to urge his prompt approval of the route. In November the mayor named a relocation committee to aid in the relocation of any person affected by any freeway constructed within the city limits.

The state highway department submitted its report on the proposed route to the Bureau of Public Roads in October. In January, 1958, the city council urged the state legislature to pass two bills to strengthen the city's opposition to the expressway. These passed the house in March but were later defeated in the Senate. The Bureau of Public Roads invited the opponents of the route to present their case at a conference in Washington held on February 14.

On April 10 the state highway department announced that the U. S. Bureau of Public Roads had approved the Adams-Jackson Streets route, leaving all legal questions up to the State of Delaware. While two city councilmen have pledged to continue the fight, the decision appears to be accepted by most of the property owners along the route. The first federal funds were allocated in April, negotiations were instituted for acquisition of some of the property involved, and on June 3 the state highway department reported that eighty-five owners along the route had advised them of their desire to sell their properties.

The opposition citizens' group announced on April 25 that it would institute court action but would take steps to insure a speedy decision on any legal issues involved. If these are decided favorably to the state highway department, this should mark the end of a long and bitter dispute.

FAI–3 has had a much smoother course to date. On June 12, 1957, the state highway department approved in principle the proposed east bypass freeway and released information on five alternative routes which had been studied by its consultants. It was announced that the planning and construction of FAI–2 would precede similar work on FAI–3; also that they would await public

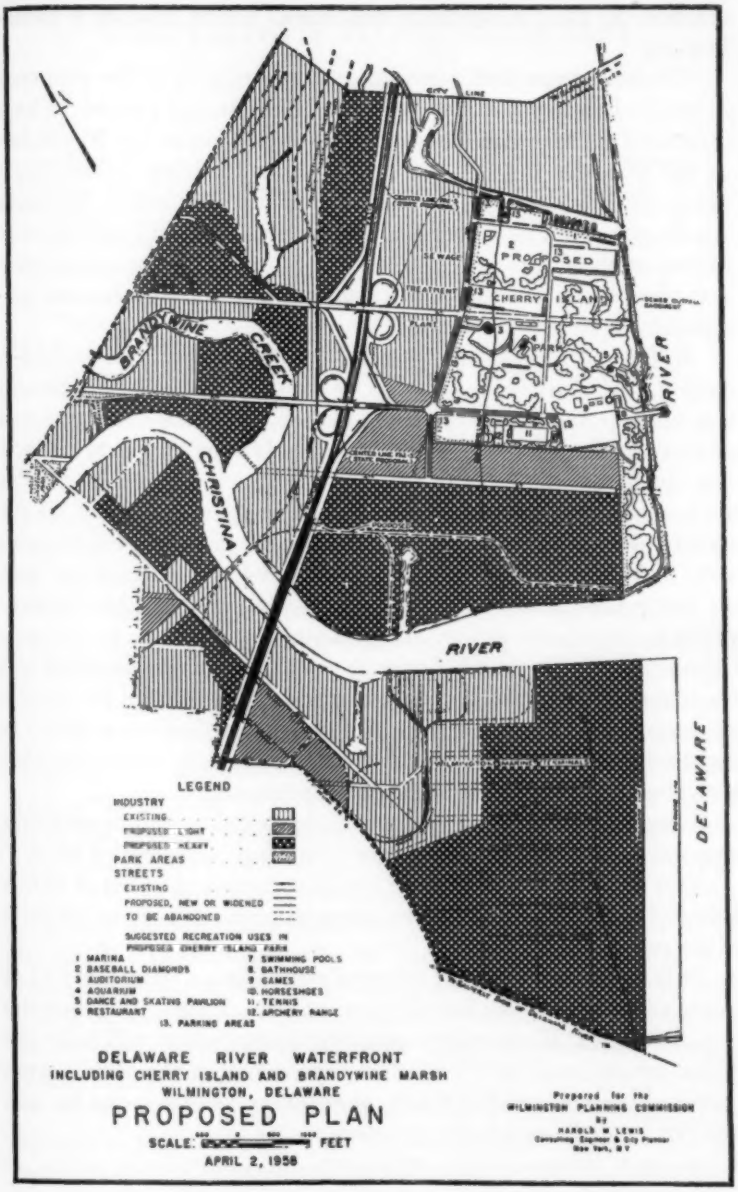

BRANDYWINE CREEK
CHRISTINA
RIVER
PROPOSED
CHERRY ISLAND
PARK
RIVER
DELAWARE
LEGEND
INDUSTRY
EXISTING
PROPOSED LIGHT
PROPOSED HEAVY
PARK AREAS
STREETS
EXISTING
PROPOSED, NEW OR WIDENED
TO BE ABANDONED
SUGGESTED RECREATION USES IN PROPOSED CHERRY ISLAND PARK
1 MARINA
2 BASEBALL DIAMONDS
3 AUDITORIUM
4 AQUARIUM
5 DANCE AND SKATING PAVILION
6 RESTAURANT
7 SWIMMING POOLS
8 BATHHOUSE
9 GAMES
10. HORSESHOES
11. TENNIS
12. ARCHERY RANGE
13. PARKING AREAS
DELAWARE RIVER WATERFRONT
INCLUDING CHERRY ISLAND AND BRANDYWINE MARSH
WILMINGTON, DELAWARE
PROPOSED PLAN
SCALE: FEET
APRIL 2, 1958
Prepared for the
WILMINGTON PLANNING COMMISSION
by
HAROLD M. LEWIS

Figure 3

reaction on the FAI–3 plans as released before holding a public hearing.

Citizen groups took action in general support of the proposal. A public hearing was held on September 30 and proved to be a quiet and orderly session lasting less than two hours. On November 12 the city council held an informal public hearing on the future development of the Cherry Island area through which the route would pass. Both departmental and citizens' suggestions were submitted at this hearing, following which the planning commission was asked to make a special study of the area and submit its recommendations to the city council.

In January, 1958, the report of the state's consultants on FAI–3 showing the route recommended by the state highway department was made public. On April 2 the planning commission completed and adopted a "Report and Recommendations on Cherry Island and Adjoining Areas" that showed how FAI–3 could be tied in with a comprehensive plan for the future development of all the unused areas along the Delaware River waterfront and the Brandywine marshes for a combination of industrial and recreational uses.

While this plan retained the general alignment of FAI–3 as proposed by the state highway department, some changes in connecting ramps were suggested. A twenty-year development program was recommended for joint action by the city, the state, and the federal government. The general features of the proposed plan are shown in Figure 3 as illustrating the successful co-ordination of city planning with the planning of this particular expressway.

It appears likely that this route will proceed to a successful consummation free of the controversy which has hampered FAI–2.

The Wilmington experience has been described in detail as it is believed to cover most of the situations that may arise in other parts of the country.

It is to be hoped that Delaware's experience with the FAI–2 route is an extreme case, but there have also been bitter controversies in other states. If other city planning commissions will take the active interest and broad-minded approach that the Wilmington planning commission has taken, expressway locations can be successfully co-ordinated with city plans.

Maryland's Road Program

NORMAN M. PRITCHETT

Mr. Pritchett has been the Chief Location Engineer of the Maryland State Roads Commission since July, 1946. Previously he served in various engineering positions with the Commission. He is a member of the American Society of Civil Engineers, of the American Road Builders Association, of the American Public Works Association, of the Maryland Association of Engineers, and other professional organizations. During his work as Chief Engineer, the Federal Bureau of Public Roads has selected five roads in the United States to be used as models for the Interstate System; two of these were located by Mr. Pritchett in Maryland.

SINCE World War II, the Maryland State Roads Commission has been rehabilitating its highways. Programs have been formulated. One post-war study resulted in the Maryland Twelve Year Program; another, the most recent, came from experience with the first four-year phase of the twelve year plan.

Early highway programming, referred to as "satisfying the greatest number at the smallest cost—greasing wheels that squeaked the loudest"—tried earnestly to use available funds for most needed improvement. District engineers and county supervisors had a program in their heads. Not based on modern techniques, their ideas, resulting from close association with their roads, were sound. Annual programming until the middle thirties came from district engineers' recommendations, correlated at headquarters on a state-wide basis. Despite modern methods fully used, we never lost sight of the value of district personnel who daily live with their roads.

When Hayden-Cartwright funds became available in the middle thirties, Maryland, organizing its "highway planning survey," produced the studies needed in the state-wide evaluations and programs. One product of the survey work was a report of Maryland Highway Needs, 1941–1960, dated September 1940, the basis of the first post World War II effort.

During that war, construction of new facilities practically ceased. Maintenance was at a low ebb. Unspent funds accumulated, so that by 1948, about a hundred million dollars was available. A bond issue

Clopettsville
Brownsville
Lewisdale
Damascus
Hyattstown
Purdum
Woodfield
Comus
Clarksburg
Cedar Grove
Dickerson
Barnesville
Neelsville
Brink
Goshen
Martinsburg
Beallsville
Boyds
Germantown
Old Germantown
Whites Ferry
Poolesville
Dawsonville
Gaithersburg
Quince Orchard
Darnestown
Hunting Hill
Seneca
ROCKVILLE
Travilah
Potomac
Cropley
MARYLAND
Broad Run
Seneca
Rock Creek
M O N T
80
122
399
123
124
108
432
121
109
240
27
604
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421
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190
191

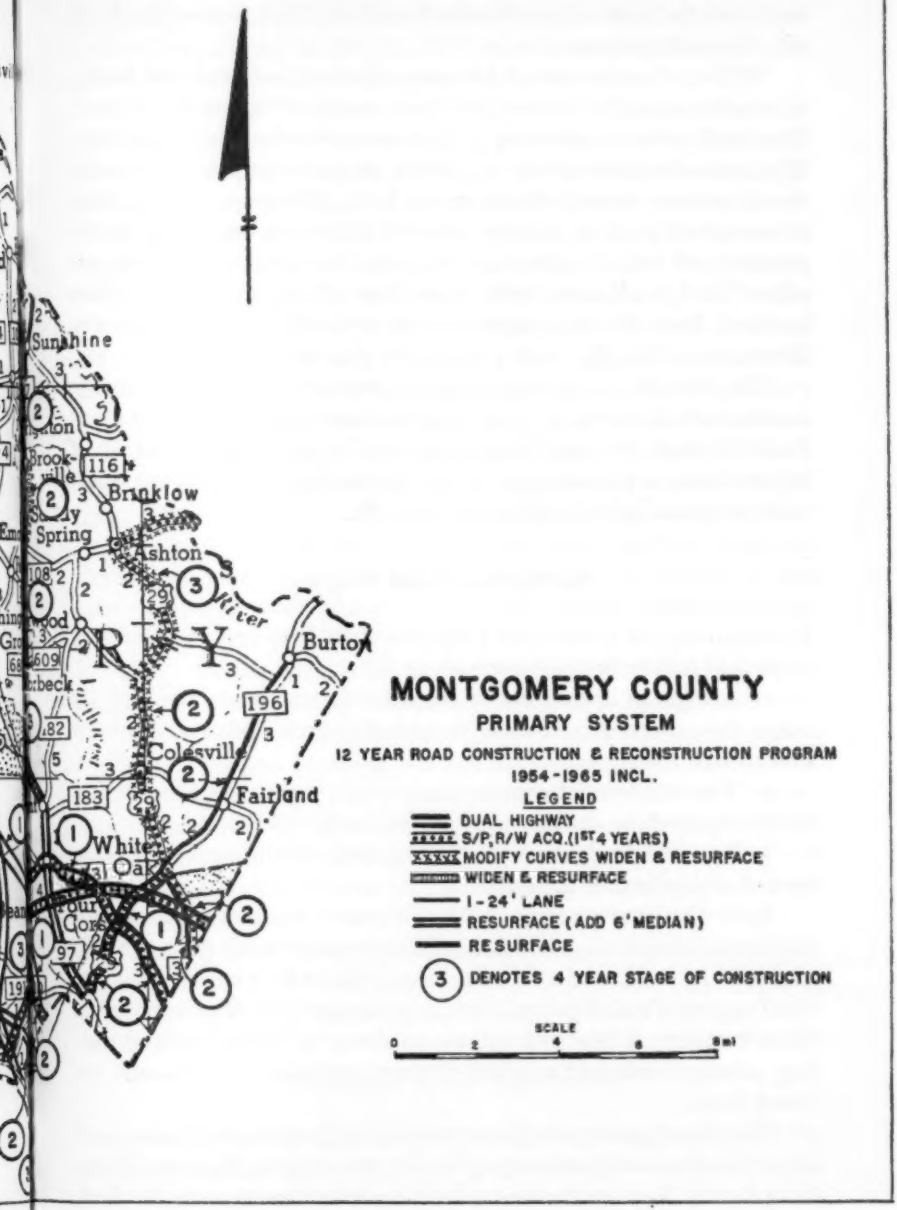

Sunshine
Brinklow
Ashton
Spring
Burton
Colesville
Fairland
White Oak
MONTGOMERY COUNTY
PRIMARY SYSTEM
12 YEAR ROAD CONSTRUCTION & RECONSTRUCTION PROGRAM
1954-1965 INCL.
LEGEND
DUAL HIGHWAY
S/P, R/W ACQ. (1ST 4 YEARS)
MODIFY CURVES WIDEN & RESURFACE
WIDEN & RESURFACE
1-24' LANE
RESURFACE (ADD 6' MEDIAN)
RESURFACE
3 DENOTES 4 YEAR STAGE OF CONSTRUCTION
SCALE
0 2 4 6 8mi

Figure 1

increased the total to two hundred million. That formed the basis of a five-year program.

Within a year or two, it became apparent that available funds, even with increased current revenue, would fall short of our goal. Practically every community in the country faced a similar problem. The general economy was beginning its post-war surge. Housing developments around Washington, D.C., Baltimore and smaller cities, added loads to heavily traveled highways. Increased motor vehicles and vehicle miles made the need for programming imperative. The State Roads Commission directed that a program be formulated. First thinking suggested a modernization of the system in fifteen years. Finally, twelve years was decided upon.

This detailed study of state-wide programming and financing, accomplished during 1951–52, became known as the Twelve Year Road Construction and Reconstruction Program. A description of its provisions is presented so we can better discuss our recent statewide program, accomplished in 1957–58.

Twelve Year Road Program

In preparing the twelve year program, three fundamental concepts were kept before the engineers:

1. Adequacy and safety of the existing system determined by inspection and comparison with desirable geometric standards in effect since 1948;

2. The relation between highway improvement and increasing traffic demands in the post-war period to that date; and

3. The end product—new construction, rehabilitation, etc., required to modernize the system.

Each district engineer, aided by his county resident maintenance engineers, prepared a schedule of improvements by type of work and priority, reviewed at headquarters, after which engineers of the chief engineer's staff joined district personnel in a final inspection of each county. These inspections, resulting in mutual understanding, usually confirmed original recommendations, occasionally revised them.

Then headquarters engineers studied each recommended section in detail. Data originally compiled by the original Highway Planning Survey, kept up to date by field inventory teams, were checked.

Traffic figures were projected to the end of 1965, the scheduled completion date of the program. Traffic forecasts were based on post-war experience to the time the program was prepared.

Correlation of physical conditions, 1965 traffic, and desirable geometric standards in use resulted in selecting specific projects for improvement, projects adequate to modernize the system by 1965. Cost estimates were based on current experience.

Figure 1 shows a typical map locating the improvements in Montgomery county necessary to modernization of the Primary State Highway System in the county; Figures 2 and 3 give in tables the details of individual projects, and separate them into each of the three four-year periods of the program. Maps and tables were prepared for each of the twenty-three counties and for the primary system and the secondary system in each county. County officials were visited, and satisfactory priorities for each of the three four-year periods were agreed upon. Two consulting engineers studied the program carefully. As finally compiled, it had their full concurrence. The total estimated cost of the program was $568 millions; the suggested method of financing consisted of an increase of one cent a gallon in taxes, an increase in motor vehicle registration fees, and $330 million in additional bonds.

This program, presented to the 1953 session of the Maryland Legislature, was passed by that body, and signed by the Governor. Provisions of the enabling legislation required a performance report by the commission covering the first four-year period, satisfactory performance in this initial period a prerequisite for continuation. The commission was granted leeway in substituting projects, but county improvement mileage was required to conform closely to amounts listed. Limitations on the frequency of issuing bonds were stipulated in the act.

The twelve year program covered the beginning of 1954 to the end of 1965. Less complex projects were advertised during the latter half of 1953; the full impact came in 1954 and thereafter.

Experience in the First Period

Each project had specified length, width of surfacing, etc., and the commission was required to report progress to the Maryland Legislature before the end of the four-year period.

Under stable conditions it would have been embarrassing to report that once again careful planning was being outstripped by the booming economy of the nation. It was impossible, however, to cope with residential, commercial, and industrial growth and continually rising vehicle miles. In metropolitan areas of some major cities, an urban street, perhaps forty-eight feet wide had been considered adequate when the program was prepared. By the time preliminary engineering phases were reached, nothing short of urban divided highways would suffice. In more rural areas it was apparent that the highway investment would be lost in a short time if controlled-access features were not included. Where a different cross-section or degree of access control, etc., was added, taxpayers benefited through a better facility, one that will serve for many more years. With necessarily increased geometrics and subsequent increased cost, it became clear that authorized funds, in excess of half a billion dollars, would not suffice for a complete job. These developments led us to restudy the entire system and to revise our program.

In its report of January 22, 1957, on the first three years, the commission met the problem, straight-forward. Without excuses, it presented a factual picture to the legislature. Continued urbanization of rural areas, and substantial increases in industrial development, it was stated, created traffic conditions impossible to forecast in 1951–52 studies. Cost increases—especially for rights-of-way—were hampering our program.

The commission summarized costs in the first two and one-half year period of the program. Construction expense increased twenty-four percent, engineering twenty percent, and the acquisition of rights-of-way, sixty-one percent. The overall weighted increase amounted to twenty-seven percent over estimates. This report noted that a proposed program for 1957 was based on current figures, not on those of 1951–52.

The commission recalled that the legislature adopted the program in good faith, based upon good faith estimates, accurate costs then current. Qualified consulting engineers concurred in the original plan. Subsequent conditions necessitated restricted operations to stay within available funds.

In February 1958, the commission reported first-period performance: Many projects—as originally conceived—could not be built.

Costs continued to increase. On a nationwide basis, the estimated cost of the Federal Interstate System was up about thirty-seven percent from the 1955 estimates; our increase was not unique. Eight-hundred-and-ninety miles were built in the first four years, instead of the 1260 miles originally scheduled. Expenditures for the 890 miles amounted to about $244 million, instead of the $227 million as originally set up for the entire 1260 miles. About $46 million in credits were being earned on interstate projects.

The commission's February 1958 report precisely detailed all phases of the program. It was recommended that the state's program be extended three years, making it coincide with the federal program. It was indicated that costs might be in the realm of a billion dollars or more.

The fact that further program revisions became necessary does not mean that we were unsuccessful in our first-period effort. We were confronted with the major problems which most of our companion states have shared in this most dynamic field of highway engineering. "Before" and "after" pictures amply demonstrate the type of accomplishments realized so far in our program.

Preparation of the 1958 Study

Experience during the initial four-year period of the twelve year program, with increasing traffic volumes, changing travel patterns, increased costs, and the impact of the 1956 federal aid highway act, necessitated another detailed state-wide study that would lead to a plan sufficient for the 1970's.

We knew that another field evaluation was necessary before we could revamp our program. Two developments aided this preliminary phase. Within this period the entire State Roads system had been marked with control-section numbers. These are permanent designations referred to in our new study in addition to actual geographical locations. The other aid was a thorough sufficiency-rating of the system.

Maryland has long been cognizant of the great value obtainable from a well-ordered sufficiency rating system. Time and personnel were not available. Finally in 1956 we were able to assign sufficient manpower to this study. Maryland drew on the records of other

states and of the Bureau of Public Roads. Figure 4 shows the scoring system first used. In the summer of 1956, a team of our maintenance engineers, a location engineer, two associate engineers from our traffic division, and the county supervisor or district engineer thoroughly inspected our secondary system. Data on this field inspection were analyzed; numerical sufficiency ratings were established. The team then made field inspections and developed sufficiency ratings for the *primary* system. It was thought best to rate each system separately and to use traffic adjustment formulas and curves developed by the Bureau of Public Roads for each system. These sufficiency ratings were given to each team making field inspections.

In developing the two systems, primary and secondary, *secondary* did not necessarily denote a road of minor importance. Early road building connected county seats with each other and to Baltimore. That comprised our primary system. Connections to important roads leading into other states were added from time to time. Other roads were placed in the general category of the secondary system. As far as importance and traffic volumes are concerned, it is unrealistic. Early in our field inspections, we realized that priorities would be confused if we adhered strictly to these two systems.

Maryland's location places most of its roads on heavy trucking routes of the eastern industrial area. Practically every route on its state system is potentially heavy. Probably few roads will not be carrying large volumes of traffic within twenty to twenty-five years. For these reasons, we dispensed with our former primary and secondary systems, rating our roads on a one-system basis. An average daily traffic for the system was determined; new ratings based on the original field inspection were developed. Close study was given to the factors entering into our sufficiency ratings and to weights assigned.

After considerable study among divisions of the commission and the Bureau of Public Roads, it was decided to modify our factors and their weights. Final revised ratings in tabular form accompanied each field team making the physical inspections of the roads. It is planned to have the original team rate our roads during the summer of 1958, and probably again every two years.

Although the sufficiency rating teams performed an excellent job of evaluating the physical condition of the state system, it was considered important to make this physical check again so everyone

concerned with the revised study would be familiar with every mile for which he was responsible. To accomplish this, it was decided to organize a pilot inspection trip for a western county of the state. A large team made the inspection.

Pilot Inspection Trip Organized

The team included an assistant chief engineer in charge of construction for the commission; six department heads from divisions primarily concerned with the study—maintenance, location, right-of-way, road design, etc.—the district engineer of the county selected, and his immediate assistants, one on construction and one on maintenance. Also included were men from our traffic division who originally made the sufficiency ratings; a group of assistant engineers who were thoroughly experienced in designing and estimating highways and bridges; and the county supervisor for the county selected.

Before other trips were begun, results of the inspection in this pilot county were studied, sufficiency ratings used as a guide. Occasionally, of course, they were deviated from. A tentative program was established and rough estimates prepared. This program and rough estimates were studied by a committee of top echelon personnel headed by the chief engineer. Changes advantageous to the system in that county were made. The inspection group attended the final meeting of this committee so that reasons for changes could be explained. Then the final program for this pilot county was compiled, estimates prepared.

Following this study of the selected county, three department heads led inspection teams throughout the state, each team responsible for seven or eight counties. Teams finally organized consisted of the department head from commission headquarters; the district engineer and his resident maintenance engineer of the county being inspected; a member of the traffic division who made the original sufficiency ratings; a member of our road design division responsible for making final estimates of the program, and a member of our location division. No member of our division of bridge design accompanied the team every mile; yet a representative of this division studied special conditions necessary in the overall evaluation and preparation of programs and estimates. District personnel were of

12 YEAR ROAD CONSTRUCTION AND TR

STATE ROADS COMMISSION
Office of the Chief Engineer

MONTGOMER DIST
PRIMAR

Route No.	LOCATION From	LOCATION To	Miles	Present Width of Pavement	TRAFFIC 1950	1954	1958	1962	End of 1965
						FIRST FOUR YEARS			
U.S. 240	Rockville	Rock Creek Parkway	4.57	30'-42'	9,979	5,000	6,081	7,182	8,075
Circumf. Highway	Prince George's Co. Line	G.W. Memorial Parkway	11.50	New	--	12,760	15,520	18,330	20,610
Md. 97	Olney	Glenmont	7.12	21'	2,913	3,717	4,521	5,340	6,004
Md. 97	Brookeville	Olney	2.40	22'	1,011	1,290	1,569	1,853	2,084
Old U.S. 29	Howard Co. Line	White Oak	11.01	20'-21'	1,200	1,531	1,862	2,200	2,475
Old U.S. 29	White Oak	Md. 97 (Ga. Ave.)	3.91	21'-46'	12,977	16,559	20,140	23,787	26,546
Md. 320	White Oak	Pr. George's Co. Line	2.62	24'	4,000	5,104	6,208	7,332	8,244
Md. 193	Chevy Chase	Kensington	2.92	18'-20'	12,754	16,274	19,794	23,378	26,286
Md. 193	Kensington	Pr. George's Co. Line	6.99	18'-20'	7,290	9,302	11,314	13,365	15,025
W/M Pike	Clarksburg Inter.	Md. 118 @ Brink	3.75	New	--	4,721	5,742	7,821	7,626
W/M Pike	Md. 118 @ Brink	Seven Locks Road	10.16	New	--	7,400	9,002	10,651	11,954
Rock Cr.Pkwy. Connection	Wash. National Pike	Wisconsin Avenue	3.65	New	--	4,193	5,166	6,154	7,257
Rock Cr.Pkwy. Connection	Wisconsin Avenue	East West Highway	3.50	New	--	6,606	8,035	9,489	10,670
Rock Cr.Pkwy. Connection	East West Highway	D. C. Line	0.98	New	--	6,606	8,035	9,489	10,670
Wisconsin Avenue	Rock Creek Parkway	Cedar Lane	1.23	30'	3,000	3,828	4,656	5,499	6,183
Md. 190 River Rd.	Wash. National Pike	Twd. D. C. Line	2.40	18'-20'	1,800	2,297	2,794	3,299	3,710
Md. 28	Rockville	Norbeck	4.42	17'-20'	1,668	2,128	2,589	3,057	3,438
Md. 27	Wash. Nat. Pike	Twd. Damascus	5.58	22'	2,130	2,718	3,306	3,904	4,390
		TOTAL	88.17						
	Total Vehicle Miles Daily				255,338	363,529	685,121	809,521	910,211
	Weighted Average Daily Traffic				4,667	6,391	7,774	9,181	10,325
						SECOND FOUR YEARS			
U.S. 240	Cedar Lane	Jones Bridge Road	0.70	40'	22,439	12,400	15,082	17,813	20,093
U.S. 240	Md. 410	Bradley Lane	0.55	1-36' 1-36' 2' Median	30,372	16,500	20,069	23,703	26,651
U.S. 240	Bradley Lane	D. C. Line	1.18	1-60' 18' Median	37,160	27,900	33,934	40,078	45,064
Md. 193	3.25 Mi.W. of Kensington	Prince George's Co. Line	3.34•	18'-20'	7,290•	9,302•	11,314•	13,365•	15,025•
New U.S. 29	Burtonsville	White Oak	5.28	80'	5,600	7,116	8,691	10,265	11,542
Old U.S. 29	0.46 Mi. S. of Md. 198	Md. 97 (Ga. Ave.)	1.11•	46'	12,977•	16,559•	20,140•	23,787•	26,546•
Old U.S. 29	White Oak	Twd. Ashton	5.52•	20'-21'	1,200•	1,531•	1,862•	2,200•	2,475•
Cir.Hwy.	Pr. George's Co. Line	Twd. G.W. Memorial Parkway	5.75•	New	--	12,760•	15,520•	18,330•	20,610•
Md. 27	1 Mi. N. of Damascus	Howard Co. Line	2.27	22'	2,642	3,371	4,100	4,843	5,446
Md. 97	Olney	Twd. Glenmont	3.56•	21'	2,913•	3,717•	4,521•	5,340•	6,004•
Md. 97	Brookeville	Olney	2.40•	22'	1,011•	1,290•	1,569•	1,853•	2,084•
Md. 320	White Oak	Prince George's Co. Line	2.62•	24'	4,000	5,104•	6,208•	7,332•	8,244•
Md. 97	Howard Co. Line	Brookeville Reloc.	4.00	22'	1,011	1,290	1,569	1,853	2,084

Continued on next page

TRUCTION PROGRAM - 1954 TO 1965 INCL.

DISTRICT Nº 3

SHEET 1 OF 2

October 27, 1952

Improvement	COST				Remarks
	Construction	Engineering	R/W	Total	
Divider	$ 540,000	$ 80,000	$ —	$ 620,000	
Highway	—	225,000	1,725,000	1,950,000	Limited Access Construction 1958-61 (a) in 1962-65 (b)
Highway	—	100,000	350,000	450,000	Construction 1958-61 (d) in 1962-1965 (e)
ing and Resurfacing	—	25,000	50,000	75,000	Widen and Resurface 1958-61 (c)
ing and Resurfacing	—	110,000	110,000	220,000	Construction 1958-61 (f) in 1962-1965 (g)
e entire length and E. of Rd. 192	957,000	143,000	200,000	1,300,000	Improve 40' section in 1958-61 (1.1½ Mi.) (h)
Utilities Exist. 24'	—	25,000	75,000	100,000	Construction in 1958-61 (j)
	1,565,000	235,000	150,000	1,950,000	
ide 3.25 Mi. Dual	1,595,000	240,000	400,000	2,235,000	Constr. 3.3½ Mi. in 1958-61 (k)
	2,075,000	308,000	--	2,383,000	Limited Access
	4,820,000	720,000	--	5,540,000	Limited Access
	1,550,000	230,000	--	1,780,000	Limited Access
	2,160,000	322,000	--	2,482,000	Controlled Access
r Dual Highway	—	20,000	100,000	120,000	Construct dual 1958-61 (m) Controlled Access
ges	90,000	12,000	--	102,000	
	1,010,000	147,000	--	1,157,000	To D.C. Line 1958-61 (n) Controlled Access
ad Resurfacing	—	20,000	45,000	65,000	Widen and Resurface in 1958-61 (L)
W and Resurface	435,000	65,000	35,000	535,000	
	$16,797,000	$3,027,000	$ 3,240,000	$23,064,000	
illes	$ 87,000	$ 13,000	$ --	$ 100,000	
	80,000	12,000	--	92,000	
Resurf. d Curb on inside and	152,000	23,000	--	175,000	
	1,535,000	230,000	--	1,765,000	(k)
	1,165,000	175,000	125,000	1,465,000	
	260,000	40,000	--	300,000	(h)
W and Resurface	257,000	38,000	--	295,000	(f) See 1962-65 (g) for remainder
	5,025,000	750,000	--	5,775,000	(a) Limited Access
W and Resurface	155,000	20,000	25,000	200,000	
	1,785,000	265,000	--	2,050,000	(d) See 1962-65 (e) for remainder
les. @ Brockville	239,000	36,000	--	275,000	(c)
Ext. 24' Road	435,000	65,000	--	500,000	(j)
	87,000	13,000	--	100,000	

Figure 2

great value in these investigations. They kept in close touch with existing and proposed residential, industrial and public development. It was possible to bring up factors for consideration that did not show up in the numerical sufficiency rating or in the current physical condition of the highway. No sections of the state system were omitted. Every mile was inspected, and notes were made by each member of the team after a control section was passed. Free discussion occurred after section inspections, comprehensive notes recorded.

The location division representative was particularly helpful with his knowledge of long-range programming, suggesting areas where complete relocations would be necessary. Before leaving the field, each member of the team had a thorough view of conditions existing at the time of the inspection and of needed improvements to modernize for 1975 traffic.

As in other states, the federal aid interstate system was the subject of a needs study required by Section 108-d of the federal aid highway act. This state-wide analysis therefore did not include detailed recommendations for roads on that system. Nevertheless, all sections were included in the field inspection phase. In many instances, interstate routes will be on new locations. Recommendations were in order for the former location, which would now be part of the state system.

Recommended Improvements

The first step to determine the type of improvement for each road was a conference between the department head from the central office and the district engineer immediately after the inspection. With physical conditions fresh in their minds, notes from the trip were examined, consideration given to knowledge of industrial, residential and public development. Recommendations were made for each section of each route, compiled on forms for the purpose. Before recommendations were passed to teams to make detailed estimates, a review committee examined all recommendations. The reviewing group consisted of the chief engineer, the three department heads who led the field teams, and other department heads from the central staff. Highway, potential land use, and probable

12 YEAR ROAD CONSTRUCTION AND F

STATE ROADS COMMISSION
Office of the Chief Engineer

MONTGOMER
PRIMAR

Route No.	LOCATION From	LOCATION To	Miles	Present Width of Pavement	TRAFFIC 1950	1954	1958	1962	End of 1965
						SECOND FOUR YEARS			
W/N Pike	Seven Locks Road	River Road	4.51	New	--	--	3,880	4,583	5,153
River Rd.	2.40 Mi. E. of W/N Pike	D. C. Line	2.43	18'-20'	1,800	2,297	2,734	3,299	3,710
Fyle Ave.	River Road	Goldsboro Rd.	0.66	New	--	--	6,208	7,332	8,244
Md. 28	Rockville	Norbeck	4.12*	17'-20'	1,668*	2,128*	2,589*	3,057*	3,438*
Rock Cr. Connection	East West Highway	D. C. Line	0.90*	New	--	6,606*	8,035*	9,489*	10,670*
		TOTAL	51.15						
	Total Vehicle Miles Daily				196,214	356,420	455,110	537,511	604,370
	Weighted Average Daily Traffic				4,909	7,752	8,898	10,509	11,816
						THIRD FOUR YEARS			
Cir.Hwy.	5.75 Mi. W. of Pr. Geo.Co.	G.W.Memorial Parkway	5.75*	New	--	12,760*	15,520*	18,338*	20,616*
Md. 97	3.56 Mi. S. of Olney	Glenmont	3.56*	21'	2,913*	3,717*	4,521*	5,340*	6,004*
014 US 29	5.52 Mi. N. of White Oak	Howard Co. Line	5.51*	20'-21'	1,200*	1,531*	1,862*	2,200*	2,473*
W/N Pike	River Road	G.W. Memorial Parkway	1.89	New	--	3,190	3,880	4,583	5,153
Mass. Ave.	Goldsboro Road	D. C. Line	2.18	20'	4,000	5,104	6,208	7,332	8,244
		TOTAL	18.89						
	Total Vehicle Miles Daily				25,702	185,565	225,703	266,568	299,725
	Weighted Average Daily Traffic				2,285	9,823	11,947	14,118	15,866
		GRAND TOTAL	113.74						
	GRAND TOTAL VEHICLE MILES DAILY				383,856	534,051	671,162	798,681	898,279
	WEIGHTED AVERAGE DAILY TRAFFIC				5,111	4,919	5,901	6,969	7,836

* Indicates Mileage and Traffic data which have been duplicated.

TION AND RECONSTRUCTION PROGRAM - 1954 TO

MONTGOMERY COUNTY, DISTRICT Nº 3
PRIMARY SYSTEM.

AFFIC			Description of Improvement	COST			
958	1962	End of 1965		Construction	Engineering	R/W	Total
FOUR YEARS			1958 - 1961 INCL. (CONT'D)				
3,880	4,583	5,153	Dual Highway	$ 2,295,000	$ 344,000	$ --	$ 2,639,000
2,794	3,299	3,710	Dual Highway	1,010,000	148,000	--	1,158,000
6,208	7,332	8,244	Dual Highway	250,000	36,000	--	286,000
2,589•	3,057•	3,438•	Mod. Curves, Widen 24' Resurf. Misc. Br. & Cr. Rock	226,000	34,000	--	260,000
8,035•	9,489•	10,670•	Construct Dual Highway	765,000	115,000	--	880,000
				$15,808,000	$ 2,357,000	$ 154,000	$18,315,000
55,110	537,511	604,370					
8,898	10,509	11,816					
FOUR YEARS			1962 - 1965 INCL.				
5,520•	18,330•	20,610•	Dual Highway (2nd Section)	$ 5,025,000	$ 750,000	$ --	$ 5,775,000
4,521•	5,340•	6,001•	Dual Highway	1,785,000	265,000	--	2,050,000
1,862•	2,200•	2,473•	Modify Curves, Widen 24' and Resurface	257,000	38,000	--	295,000
3,880	4,583	5,153	Dual Highway	961,000	144,000	--	1,105,000
6,208	7,332	8,244	Dual Highway	930,000	138,000	--	1,068,000
				$ 8,958,000	$ 1,335,000	$ --	$10,293,000
225,703	266,568	299,725					
11,947	14,110	15,866					
				$ 41,563,000	$ 6,719,000	$ 3,390,000	$51,672,000
671,162	792,681	891,279					
5,901	6,969	7,836					

SHEET 2 OF 2

October 27, 1952

otal	Remarks
,639,000	Limited Access See 1962-65 (P) for remainder to Geo. Wash. Pkwy.
,158,000	(n) Controlled Access
986,000	Controlled Access
260,000	(l)
869,000	(m) Controlled Access
,315,800	
,775,000	(b) Limited Access
,058,000	(e)
895,000	(g)
,105,000	(p) Controlled Access
,868,000	Controlled Access
,293,080	
,672,000	

Figure 3

STRUCTURAL ADEQUACY
30 POINTS POSSIBLE
DEDUCTIBLE POINTS

WEARING SURFACE
8 POINTS POSSIBLE

8	7	6	5	4	3	2	1
RECONSTRUCTION REQUIRED			EXTENSIVE CRACKING AND FAILURES				OCCASIONAL FAILURES

BASE
10 POINTS POSSIBLE

10	9	8	7	6	5	4	3	2	1
RECONSTRUCTION REQUIRED					EXTENSIVE BASE FAILURES			OCCASIONAL BASE FAILURES	

DRAINAGE
12 POINTS POSSIBLE

12	11	10	9	8	7	6	5	4	3	2	1
CULVERTS IN POOR CONDITION OR NARROW			PIPES INADEQUATE IN SIZE OR STRUCTURE			POOR OR INADEQUATE DITCHES		POOR SOIL OR SOIL CONDITIONS			LOW GRADE LINE

NOTE: DEDUCTIONS OF POINTS IN DRAINAGE MAY BE MADE SINGLY OR CUMULATIVELY.

SURFACE WIDTH
16 POINTS POSSIBLE

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

SURFACE WIDTH 16 FT. OR LESS—ALLOW 0 POINTS. DEDUCT 2 POINTS FOR EACH FOOT OF SURFACE WIDTH WHICH IS UNDER THE DESIGN STANDARD WIDTH FOR 2-LANE HIGHWAYS. E.G., IF THE DESIGN WIDTH REQUIRED IS 22 FT. AND THE ACTUAL SURFACE WIDTH IS 20 FT., THE RATING WOULD BE 16 PTS.—(22'-20') 2 EQUALS 12 PTS.

SHOULDER WIDTH
10 POINTS POSSIBLE

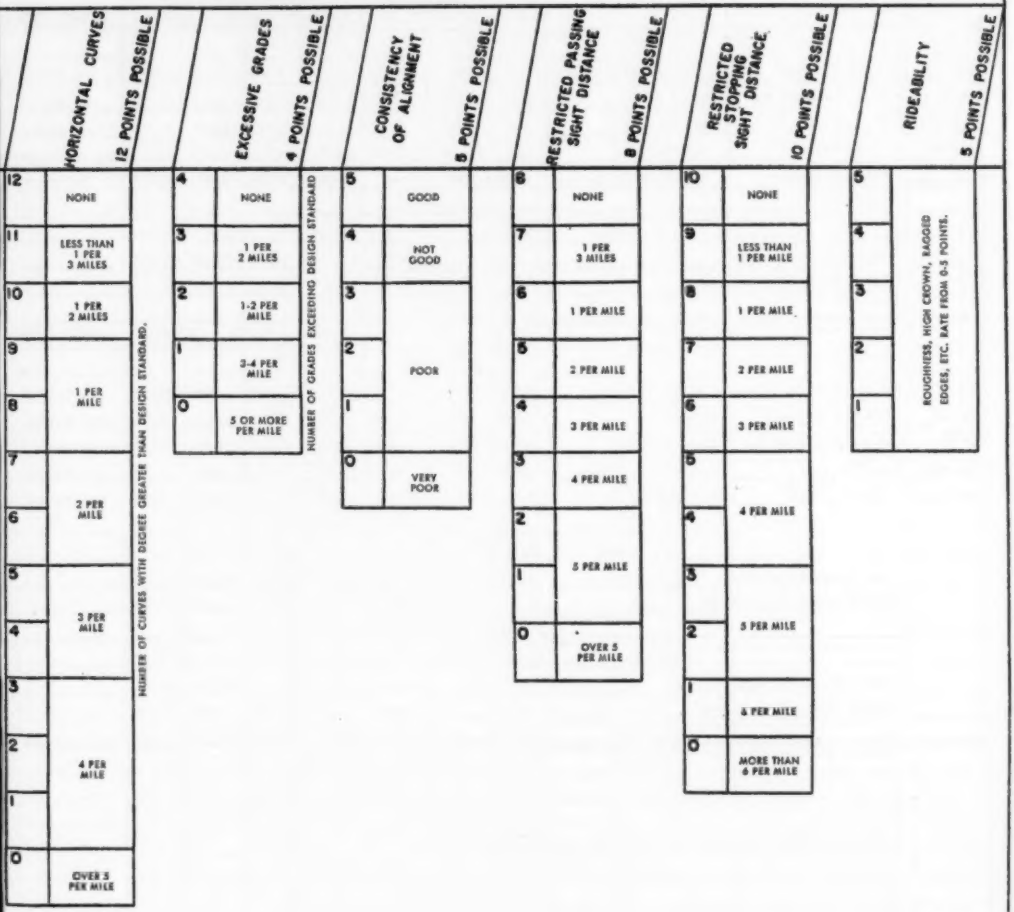
10	9	8	7	6	5	4	3	2	1

SHOULDER WIDTH LESS THAN 2 FT.—ALLOW 0 POINTS. SHOULDER WIDTH GREATER THAN 2 FT. ALLOW POINTS, USING THE RATIO OF ACTUAL SHOULDER WIDTH TO THE DESIGN WIDTH.

SAFETY AND TRAFFIC SERVICE

70 POINTS POSSIBLE

ASSIGNABLE POINTS



THE BASIC NUMERICAL SUFFICIENCY RATINGS FOR ROAD SECTIONS ARE DETERMINED BY THE ABOVE METHOD. A FINAL SUFFICIENCY RATING FOR EACH ROAD SECTION IS OBTAINED BY MAKING AN ADJUSTMENT FOR THE AVERAGE DAILY TRAFFIC ON EACH SECTION. ANY ROAD SECTION WITH AN AVERAGE DAILY TRAFFIC VOLUME ABOVE THE STATE-WIDE AVERAGE WOULD RESULT IN A RATING LOWER THAN THE BASIC RATING FOR THAT SECTION INDICATING A GREATER NEED FOR IMPROVEMENT.

Figure 4

development in the area were considered. Co-operation was readily obtained from regional and county planning boards. Traffic estimates through the 1975 period were available. These traffic figures were also available for the field inspection trips. They were of invaluable aid in the present study.

Estimating Teams

The next step prepared estimates: (a) construction, (b) administration and engineering, and (c) rights-of-way. Personnel who had proved their ability would be necessary for this phase. They would confer with each other and with various departments. Care was exercised to select men diligent in their own work and reliable for establishing and keeping good relations with departments dealt with. They were quartered so as to concentrate exclusively on this study—in offices occupied only by others on this state-wide survey, placed temporarily under the supervision of the office engineer.

This group consisted of experienced designers from divisions of road design and bridge design; estimators and negotiators from the right-of-way division; location engineers; and men from the traffic division who worked out the original sufficiency rating.

We had no desire to be caught again with estimates too low. On the other hand, we believed we should avoid any extrapolation of existing curves. Since 1951 we have kept cost estimates of major subdivisions of highway construction. Data have been examined for different classes of work such as reconstruction and new construction, and for two-lane roads and four-lane facilities with narrow medians and with wide medians. These studies have been divided into four geographical areas of the state so that terrain and soil conditions prevailing would be relatively constant. The data considered, with the mileage costs of projects advertised the preceding year, formed a good basis on which to base our estimates for the state-wide study.

Representatives of the road design and bridge design divisions worked closely in arriving at these construction costs. Our right-of-way men were experienced with acquisition costs and cost trends for ordinary highways, divided highways, controlled access highways, etc., throughout the state. They drew likewise on their ac-

cumulated data and experience within the last several years. Administration and engineering costs, as usual on a percentage basis, were accurate and in line with percentages from our comptroller, based on the last few years' experience.

Traffic engineers of this group solved problems incident to traffic and sufficiency ratings. They aided in suggested traffic-handling devices at intersections and interchanges, obtained localized counts where necessary, and later helped to establish priorities where sufficiency ratings were used as a primary guide, occasionally deviated from.

Location engineers helped in office studies. Someone in their location group usually could give a good round-up as to terrain in practically any part of the state. If necessary, he would make an occasional check trip to the field to verify a recommendation.

Reviews of this work we knew would be necessary. To have it in a form suitable for reviewing, it was necessary to compile the projects for each county in a preliminary form and prepare a preliminary map.

Estimates, Priorities and Maps

The initial task of the review team was to examine estimates, the scope of projects, suggested priorities, etc., computed by the office review team. The team that considered each county separately was similar to the one that reviewed the pilot county. The chief engineer headed it and three department heads who accompanied each field group were present. Also, the commission's chief location engineer attended, accompanied by an assistant, the man particularly familiar with the county reviewed. Men who actually made the estimates —from road design, bridge design, right-of-way and traffic divisions, with the office engineer who headed the group were included.

These reviews were concerned principally with costs, the type of work proposed, correlation of work in one county with work in an adjacent county, the consideration of entirely new routes necessary in several parts of the state, and possible developments that might affect the road network planned for the 1970's. In this latest state-wide study, we closely considered mutually advantageous exchanges between county road systems and the state system. When

an entirely new state route appeared necessary, the county often was willing to take back into their system the parallel routes relatively close to new state routes.

The review carefully analyzed suggested changes. Although work on the federal interstate system was not included in our statewide review, the proposed construction of the interstate system had considerable effect on projects planned. It was necessary to consider the interstate system as it influenced our own system in counties where the interstate system existed. When projects for a county were whipped into shape, the office forces compiled their program of improvements.

The final form for presentation to the legislature was developing. But at this point it had not been finally decided upon. What was needed was to tabulate this comprehensive review of the state system and thoroughly discuss it with county authorities.

Conferences with Local Delegations

When half of the counties were reviewed, maps and tables prepared, conferences began with county delegations. Close co-operation with the county groups is a valuable asset to the ultimate success of any study or program. County delegations consisted of county commissioners or county councils, according to the government of the county. Also representatives in the Maryland State Legislature from the county formed an important part of the delegation. Meetings were held at commission headquarters in Baltimore, usually consisting of a day's meeting. The program was explained in detail by the chief engineer aided by one or two top staff members. Copies of the program and maps were furnished so the delegation could take them back to their counties to digest. After a week or so, one or two members of the headquarters staff visited the county for further explanation or consideration of projects, suggestions of transfer, etc.

Study Presented to 1958 Legislature

Little difficulty was encountered in these contacts; mutually acceptable programs were arrived at. As conferences with the counties were completed, the final step was to decide in what form this

accumulated data should be presented to the 1958 session of the legislature. More meetings of the reviewing committee helped by accounting division representatives determined a presentation.

This State Highway System Study, Including Sufficiency Ratings sums up the work so well that it is presented here.

"Traffic volumes and travel habit patterns have changed materially since 1951–52, when the data contained in the Twelve Year Program (hereinafter referred to as the TYP) were prepared. Consequently, it was deemed imperative to make a comprehensive review of the projects remaining to be initiated in the TYP and to review those sections of state highways which were not included in the TYP for improvement.

"The maps and tabulations contained herein are the culmination of extensive engineering review, analysis and study of every mile of road on the state highway system.

"To obtain the comparative needs of the various sections of the system comprising 4,700 miles, numerical evaluations known as 'Sufficiency Ratings" were prepared for each section.

"Factors used in developing these sufficiency ratings were: (a) wearing surface, (b) base, (c) drainage, (d) surface width, (e) shoulder width, (f) horizontal alignment, (g) vertical alignment, (h) consistency of alignment, (i) passing sight distance, and (j) traffic volume, which was used as an adjustment factor to obtain the final rating.

"Sufficiency ratings are similar to school markings. They range from 100 for a road adequate in each category to our lowest section of road on the system. Any road rated sixty or under should be considered for improvement. Roads rated between sixty and seventy require careful watching. Ratings from 70 to 100 indicate conditions ranging from fair to excellent.

"To insure a uniform approach in each county and to each mile of road, the same team of engineers established the sufficiency ratings for all of the state roads.

"Following completion of the sufficiency ratings, a second and an objective review was made in the field, of every mile of highway. The reviewing teams were composed of representatives of the following divisions of the Commission,—Location, Traffic, Bridge, Design, Right-of-Way and District.

"As a result of the sufficiency ratings and the field review, it became obvious that certain roads not included in the TYP were in need of various degrees of improvement. Also, the study indicated that some projects included in the TYP could be deferred. Normal maintenance during the remaining years of the program would keep these roads in adequate condition.

"Data were compiled in tabular form and estimates prepared reflect-

ing current construction and right-of-way costs for the projects remaining to be initiated in the TYP, and additional projects recommended for inclusion in an over-all program.

"Projects are listed in the order of their sufficiency ratings, with those in greatest need of improvement heading the listing of each category.

"It is believed that the data contained herein reflect a sound approach to the problems inherent in design, traffic safety and state highway needs.

"Before this report was compiled in final form, the delegates to the General Assembly from each county, the County Commissioners and the members of the County Councils, at the invitation of the State Roads Commission, examined the findings of the review team—as such findings affected their respective communities. They did this in conference with the chief engineer and the members of his staff.

"The final report of each county reflected general basic agreements reached as a result of these conferences.

"The data are presented in the tabulations by the following categories:

I. List of TYP projects to be initiated after December 31, 1957 by program periods in the order of their sufficiency ratings, beginning at the lowest, together with current estimates of costs.

II. List of TYP projects to be initiated after December 31, 1957 by sufficiency ratings without regard to TYP program periods.

III. A review of the state highway system as of December 31, 1957

(A) Recommended for normal maintenance.
(B) Projects under construction December 31, 1957.
(C) Projects advertised but not awarded December 31, 1957.
(D) Surveys, plans and rights-of-way (1958–61) for future construction.
(E) Surveys, plans and rights-of-way (1962–65) for future construction.
(F) Construction needs (1958–61).
(G) Construction needs (1962–65).
(H) Construction needs (1966–68).

IV. Summary of state highway data as of December 31, 1957.

(A) Estimates as shown in TYP Yellow Book.
(B) Revised estimate of TYP projects.
(C) Needs estimate as developed by 1957 review of state highway system."

Detailed break-downs, both of the twelve year program and of the revised suggested study are given. Thus, everyone in counties concerned had a complete picture of what was accomplished; of costs if we adhered strictly to the twelve year program as originally compiled; and of costs if we proceeded with our realistic study, based on experience in the twelve year plan's first four-year period.

Subdivision I is a review of TYP projects to be initiated after

December 31, 1957. These projects are grouped in their program periods. In compiling these projects for any period of the twelve year procedure, priorities originally published were not necessarily adhered to. Yet projects were grouped in ascending order of sufficiency rating. In Subdivision II, all projects remaining in the TYP were grouped together. Previous groupings by program periods were not followed in this table. The entire list of projects was arranged in ascending order of sufficiency ratings. These subdivisions were arranged in order of their sufficiency rating so county delegates and other interested local people would know why any priorities formerly established might be changed in the final program.

These compilations comprise background material leading to Division III. This actually is the result of the state-wide highway system study. The first of Division III's eight sub-sections lists the projects recommended for normal maintenance. This means that the road's condition should carry it through 1968, the end of the period covered by the state-wide study. In considering the entire system, coming up with a recommended program of work, it was necessary to list projects already under construction on December 31, 1957, and likewise to list projects advertised but not awarded as of the same date. Compilations of these two sub-sections were then given in tables.

Following these initial sub-sections, the next two are for surveys, plans, and right-of-way acquisition for future construction. The first is for work of this type in the 1958–1961 period. The second subsection covers work for the 1962-65 period. Actual advertising and construction follow later. A close examination of the tables will show at what period this work is scheduled. Even when the twelve year plan was made up in 1951 and 1952, it was realized that some right-of-way would be difficult to acquire, and that it should be done as early as possible.

Experience in our first four years impressed this fact more and more upon us. We knew that many areas were ripe for potential development. We had co-operation from regional and county planning and development boards, who gave us their latest information on changing land-use and future development areas. Thus we spotted locations where acquisition would be more than normally troublesome. We listed many projects in these two categories.

Areas of difficult acquisition are often within the metropolitan regions of important cities. In some of these areas, it was necessary to acquire all right-of-way for the troublesome spots in the 1958-61 period, not defer it. After listing the projects for early right-of-way acquisition, the report gets down to actual construction needs divided into two four-year periods, 1958–61 inclusive; 1962–65 inclusive; and a three-year period, 1966–68 inclusive. This 1968 period extends the original twelve year program by a three-year period.

Pages in the study showing details of construction needs for the several periods are to some extent similar to those originally appearing in the twelve year proposal. Although projects are grouped on a one-system basis, a column is added to ascertain whether the project is on the old established primary or secondary system. Records referring to these two systems for half a century cannot be dropped overnight. A control section number is given for each project; and a numerical sufficiency rating with the project's county rank and state-wide rank. Other than this, the detailed sheets are similar to the twelve year plan, except that traffic has been forecast to 1975.

Division IV for each county summarizes state highway data for December 31, 1957. Section A of this summary deals with estimates as shown in the original TYP. This section indicates the cost of improvements to the state system as suggested in the TYP. Then it deducts projects in that study on the interstate system.

Section B of this summary gives a revised estimate of the state highway system projects listed for improvement on the original TYP. Section C details the cost of various types of work necessary for the state system. Cost of right-of-way in various periods and the cost of construction in these periods is listed separately.

This sheet enables any county to determine quickly what was considered adequate in the TYP as a result of the 1951–52 study. Next it enables a county to compare this program minus interstate projects with costs at current prices; and finally, to realize what it will cost in a particular county to construct or reconstruct the entire system for adequacy in the 1970's.

The "State Highway System Study, Including Sufficiency Ratings," presented to the 1958 session of the Maryland Legislature with the commission's report covering its first four-year performance is considered by the commission a good and comprehensive report.

It is hoped it will form the basis of a definite program to be authorized by the 1959 legislative session.

Legislators have been sympathetic with our problems. It was pointed out that continuation of the twelve year program would depend upon satisfactory performance during the first four-year period. Full aims of the four-year period were not met because of conditions described. Yet the legislature did not curtail any of the commission's activities, and the program is continuing. We believe the legislature also considered the state-wide study a good one. They allowed substitutions from the state-wide study for projects not in the original twelve year proposal. We hope our study will become a full-fledged program. The commission has not suggested any definite method of financing. A source of additional revenue authorized in the TYP—increased registration fees—was eliminated by subsequent legislation. It seems probable that by including this registration increase with extended program time, the cost of the state-wide study, slightly more than a billion dollars, can be met.

Sometimes early programming of state-wide nature seems a disadvantage in light of later developments. Maryland has experienced this paradox. We know that other states have also. In our TYP, many routes on the federal interstate system were included for improvement. Some of these have been completed to full standards acceptable to the interstate system.

The case for reimbursement is being studied by the Bureau of Public Roads and Congress. In other cases the *interstate needs* study requires routes on new locations at great cost. Even the matching funds which, including administration and overhead, approach twenty percent, rather than the ten percent usually thought of, necessitate re-scheduling certain projects.

Excellent as is the granting of a large part of the funds for the interstate system, it necessitates readjustment to the program under which we operate. Difficulty may be experienced in finding the matching money to earn our full share of the interstate funds. We do not believe the problems are insurmountable. We look forward to the establishment of a longer range program in 1959—based on our 1958 "State Highway System Study, Including Sufficiency Ratings."

Automobile Insurance Rates Make A Barometer of Accident Costs

A. E. SPOTTKE

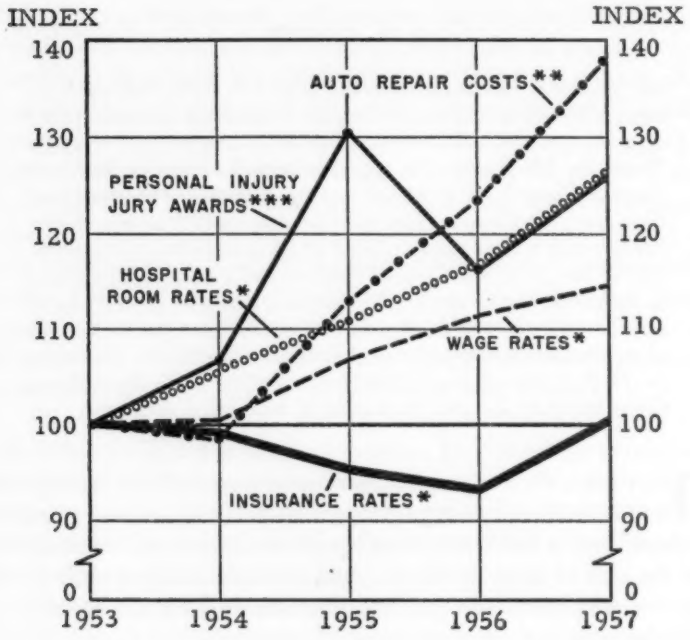
Mr. Spottke is Vice President in charge of Public and Industry Relations, of the Allstate Insurance Companies. He joined Allstate in 1952 as a vice president and was named to his present position in 1953. Previously, Mr. Spottke was associated with the National Bureau of Casualty Underwriters as Manager of the Automobile Department and Chairman of the Governing Committee for Automobile Insurance; he also had served as vice president in charge of the casualty and surety operations of the Continental Casualty Company and a member of the Board of Directors of the Company. Mr. Spottke is a member of the Board of Directors of the National Safety Council and Assistant to the Chairman of the Business Advisory Panel of President Eisenhower's Committee for Traffic Safety. He is also Vice Chairman of the Traffic Safety Policy Committee of the National Association of Independent Insurers.

DRIVERS, themselves, set their own automobile insurance rates and they are not doing a good job of it. For insurance premiums are based on the total number of accidents among a group of drivers and the cost of these accidents. And as traffic safety people know, both the frequency and severity of accidents have increased at an alarming rate.

By applying the rules of careful driving, the public could eliminate more than half the accidents immediately, and bring about a sharp reduction in insurance premiums. *Safe driving is the only way to cut down on accidents and insurance costs.* That statement highlights the direct relationship between effective traffic safety efforts and doing something to keep insurance premiums at the lowest possible level.

Progress has been made in lowering the death rate per mile traveled. In 1957, the number of fatalities actually decreased by 1,100. Further improvement was made in the early part of this year. Yet, bodily injury and property damage continue to rise. Because of their tremendous volume, they far exceed the fatal accidents as an influence on insurance rates.

Last year traffic accidents reached the staggering total of more than ten million. About 1.5 million men, women and children suffered personal injuries. This is a number equal to the combined



Sources:
* U. S. Department of Labor,
Consumer Price Index Annual Averages
** A Major Automobile Insurance Company
*** Report of Judicial Conference, State of New York

Figure 1. Important factors in traffic accident costs have increased much faster than automobile insurance rates.

populations of Boston and Pittsburgh. That's more casualties in one year than our armed forces suffered during World Wars I and II.

At the same time, accidents are getting more expensive. The total dollar cost of the nation's 1957 traffic accidents went well be-

yond the $5 billion mark. (See Figure 1.) Insurance companies actually have been paying out more money for claims and expenses than they received from policyholders in premiums. As a result, insurance rates have gone up in all states and Canada during the last two years. This in itself is not surprising. The prices of most things we buy today have gone up far more than insurance.

However, prices for other products or services inch up steadily and quietly. Insurance premiums change in sporadic spurts, often causing misunderstanding among the public.

Costlier Claims Raise Rates

The explanation for higher rates is costlier claims and more *of* them. Causes of claims are all around us:

1. More drivers and more cars—creating congestion and collisions.

2. Faster cars—bringing more serious accidents and more damage.

3. More costly cars, dictated by the public's preference, with today's body styles making almost all damage expensive to repair. (See Figure 2.)

4. Higher damage suit judgments, as well as higher court costs and legal fees. Exceptionally high jury awards may get headlines, but the money comes out of your pocket.

5. Increased medical and hospital costs.

6. Inflationary effects on payment for wages lost, and on the other elements of accident costs, making any accident more expensive than ever before.

In recent years, insurance policies generally have been broadened to provide the policyholder more protection. While the price of the basic insurance product has increased, rates are up far less than are the various elements that affect the cost of repairing cars and people.

As an example, the president of one major insurer recently stated that in the last twenty years, wage rates have gone up 231.7 percent, and medical care has risen considerably, with hospital room costs alone going up more than 200 percent. Wholesale prices in general went up 105.9 percent since 1937. Meanwhile, he noted, his com-

pany's automobile liability insurance rates across the country have gone up only an average 50.9 percent despite improved coverage and more expensive car repairs.

A new car in 1957 cost 139 percent more than one in 1942. A front fender was 135 percent more; headlamp assemblies 127 percent more; and windshields were up several hundred percent, he declared. Obviously, the chance of a crippling financial loss now is greater for the person who lacks adequate insurance protection. Automobile insurance has become more vital for the motorist and his family than ever before.

Companies Suffer $250 Million Loss

Ready availability of dependable automobile insurance is taken for granted in our country. As an outstanding example of competitive enterprise at work, the insurance industry provides an indispensable service in our society.

In the last few years, however, the automobile insurance industry has suffered serious underwriting losses. It is estimated that in 1957, for example, the several hundred companies underwriting motor car risks paid out more than $250 million more in claims and expenses than they collected in premiums for automobile insurance. One company alone suffered a $14 million underwriting loss during the year.

While 1957 losses set an all-time high, automobile insurers operated under difficult conditions for some time. The National Bureau of Casualty Underwriters, comprising one large segment of the industry with 112 member companies, reports that these companies have lost $216 million in the last three years on automobile liability insurance. This is the coverage which protects you against bodily injury and property damages you might do to others.

Of this amount, $147 million was lost in 1957, $64 million in 1956, and $5 million in 1955 when the accident loss situation entered its present critical phase. Indicative of the industry's giant problem, the 112 companies last year paid out $116.70 in liability claim costs and expenses for each $100 in premiums taken in, a sharp increase over the $108 paid out for each $100 during the costly year, 1956.

Sampling results of casualty companies for the first quarter of 1958 indicated a continuation of the unprofitable trend, President William H. Burhop of the American Mutual Insurance Alliance reported. The surveyed mutual companies, members of the Alliance, lost more money on automobile insurance in the first quarter of this year than in the first quarter of 1957, despite the fact that most states have approved rate increases during the last year.

Unprofitable Trend Continues

The National Underwriter, an insurance trade paper, in its annual automobile issue published this June, commented on 1958 first quarter results for the industry: "The average bodily injury paid-claim cost continues to rise in every quarter and the frequency is up, as in practically every quarter in the past two-and-a-half years. No one section of the country shows much variation."

But what about the insurance rate increases? *The Eastern Underwriter*, another trade journal, observed in its annual Production and Sales edition of June 20, 1958: "The inadequacy of automobile rates continued to be one of the major problems. . . . While the rate increases approved by over 40 states in 1957 helped the situation, the full effect of these increases (and those granted in over 20 states so far this year) will not be fully realized until 1959 or later."

By then, increased accident costs may more than offset current rate increases, since liability rates presently going into effect may be based on loss experience of approximately two years ago. In other words, the companies often pay losses on 1958's inflated values while collecting premiums at 1956's lower prices.

Determining Rates

Then, too, it can take up to two years for a company to realize the benefit of a premium hike on an individual's coverage. For instance, a person who renewed his policy just before a rate increase went into effect, may have coverage at his old rate for almost a year before his policy premiums are increased. When they do go up, the higher annual premiums are earned by the company only one-twelfth at a time as it provides protection each month.

Every driver will see why rates have gone down when accident costs have decreased, and why rates are up now because accidents and related expenses are soaring. Usually each state is divided into rating territories. A basic rate is established for each territory. To do this, a staggering mass of statistics is gathered. Each accident is charged to the area where the car is garaged, as shown on the policy.

How many accidents happened to drivers living in the territory? How much did it cost to settle claims? Is the cost of repairing cars up or down? Is the average daily hospital bill rising?

When these and other questions are answered, the actuaries, with charts, maps, tabulating machines and electronic computers, determine how much must be charged each class of drivers to pay claims and meet expenses in each territory.

The cost of liability insurance is determined by these general factors:

Where You Live. When you drive in city or busy suburban traffic your chances of having an accident are greater than if you drive on rural roads or quiet streets. The rapid movement of people to the suburbs is causing traffic congestion there which is comparable to the cities, in many instances. Rates vary from state to state and city to city.

How You Use Your Car. The type of driving you do—for pleasure, for business, for driving to work—has a bearing on the number of miles you drive and your chances of having an accident.

Age of Youngest Driver. Most companies charge more if a male under-25 drives the car. This surcharge results from records that under-25 male drivers, as a group, have many more accidents than the average drivers. But studies show that *trained* young drivers have better driving records than their untrained companions. Most insurance companies, therefore, offer price reductions on policies protecting young drivers who have completed accredited high school driver training courses.

More specifically, most companies have six rating classifications of urban drivers in most states. These categories are:

1A. The adult car owner who uses his vehicle only for pleasure driving.

1B. The adult owner who drives to work a distance of less than ten miles each way.

1C. The adult owner who drives to work more than ten miles each way.

2A. The owner of a family car also driven by an unmarried male driver under 25 years old. Also in this category are married male drivers under 25 who are the principal operators of a car.

2C. The unmarried male driver under 25 who owns his car or is the principal user of the family car.

3. The driver who uses his car in business. The age of the youngest driver also figures in rate determination here.

Most states also have three or four rating classifications for farm residents.

In determining the cost of collision and comprehensive—coverages that apply to damage to your car—additional factors, the value and age of your car, are considered. A big, new, expensive car with lots of ornamentation and expensive accessories costs more to build, and it costs more to repair after an accident. So your rate is determined by the accident frequency and by the cost of accidents of drivers in your rating territory, among the drivers in your classification.

When rates have been worked out for all territories and classes of drivers, they are submitted to the state insurance department. If after a review the insurance department decides the rates are fair, permission is given to the company to put the rates into effect.

Local Accident Costs Determine Rates

Comparison of rates in different parts of the country and among different classes of drivers readily shows how their collective accident experience determines how much they pay for insurance protection.

Motorists in congested metropolitan areas, for example, generally pay higher insurance rates. Suppose an unmarried male resident of Chicago under age 25, the principal driver of a car, buys a policy from one of the member companies of the National Bureau of Casualty Underwriters. This person, who is in the highest individual rating classification, would pay $223.40 a year for protection against damage claims of up to $10,000 for injuries to one person, up to $20,000 for injuries to two or more persons in a single

accident, and up to $5,000 for property damage. But a similar resident of Denver, where accident losses are not as great, would pay only $101.60 for the same coverage.

Other companies' rates vary to a degree from these, but the Bureau rates are frequently cited for illustrative purposes. As indicated by the rating classification plan, some drivers, like some areas, have proved themselves much better risks than others. The family man who doesn't drive to work, use his car in his business, or allow anyone under age 25 behind the wheel would qualify for the adult pleasure rate. He would pay Bureau rates of $89 for a "10–20–5" policy in Chicago and only $32.80 in Denver.

These figures do not include premiums for comprehensive physical damage, collision, medical payments, uninsured motorist protection, and other desirable coverages. Emphasis on this wide variation among insurance rates may be an effective method of bringing home the economics of the traffic problem to all who drive.

Community Traffic Plan Saves Money

In communities where people have joined in effective citizen traffic safety programs, insurance rates often have been maintained at a lower level or reduced, even in the face of extreme inflationary forces. In St. Joseph, Missouri; for instance, a concerted traffic control and accident prevention program not only is saving lives and reducing injuries. It also is saving the co-operative citizens thousands of dollars in automobile insurance premiums, compared with other cities in the state.

New rates published in February, 1958, by the National Bureau of Casualty Underwriters for its member companies, reveal that St. Joseph had the lowest rates for any Missouri urban rating territory for liability insurance on passenger cars. In some driver classifications its rates were lower than the "remainder of the state" territory, which covers the smaller towns and rural areas. Other companies give similar recognition to St. Joseph's lower accident costs by establishing a reduced rate schedule for the area.

The significant difference between rates in St. Joseph and in other rating territories for private passenger automobiles is illustrated by Bureau premiums for "10–20–5" liability insurance coverage for adult pleasure drivers:

St. Joseph, $52.00; Springfield, $63.80; remainder of state, $63.80; Joplin, $65.20; St. Louis Suburban, $65.40; Kansas City Suburban, $65.40; Kansas City, $78.40, and St. Louis, $99.00. Perhaps an appeal to the purse strings of the driver would be as effective in promoting safe driving as a plea to help save lives.

LOCAL ACCIDENT COSTS DETERMINE LOCAL INSURANCE RATES

DALLAS CITIZENS TRAFFIC COMMISSION LEAFLET CITES COMMERCIAL RATE DIFFERENCES BETWEEN DALLAS AND CITY X IN SOUTHWEST TO ENCOURAGE LOCAL BUSINESS SUPPORT OF TRAFFIC SAFETY

Description of Unit	*Basic Limit Coverage*	*Annual Premiums* *Dallas*	*City X*
Private Passenger Automobile, Business and Non-Business Use, Class 3.	Bodily Injury	$ 22.00	$ 37.00
	Property Damage	21.00	26.00
TOTAL		$ 43.00	$ 63.00
Commercial Automobiles operated within 50 mile radius in business of Manufacturing, NOC, Class CA 5.	Bodily Injury	$ 42.00	$ 92.00
	Property Damage	42.00	62.00
TOTAL		$ 84.00	$154.00
Commercial Automobile operating over 300 miles from limits of city or town where principally garaged and used for business of Manufacturing, NOC, Class 5 plus surcharge 40%.	Bodily Injury	$ 58.80	$128.80
	Property Damage	58.80	86.80
TOTAL		$117.60	$215.60
Combined Tractor and Semi-Trailer, Class CB 2 Long-Haul operating in Dallas County, but not Harris or Territory 1A (Jefferson, Galveston, etc.).	Bodily Injury	$155.00	$173.00
	Property Damage	113.00	130.00
TOTAL		$268.00	$303.00

These are one vehicle figures on minimum coverage (of $5,000–$10,000–$5,000 liability insurance). Figures based on reports of Dallas Insurance Agents Association.

Figure 2

Insurance Savings Appeal to Business

One of the most effective written requests for support of acitizens' traffic safety group is a leaflet recently prepared by the Dallas Citizens' Traffic Commission. (See Figure 2.) "Check Your Savings

On Automobile And Truck Rates Before You Answer This Request," is the statement in bold letters on the cover.

Inside, the leaflet charts rate differences then in effect between Dallas and another major Southwestern city. Coverage costs are listed for four types of business vehicles and usages. The annual savings to Dallas businessmen, resulting from a better traffic record, are apparent.

The pamphlet notes, for instance, that for commercial automobiles operated within a fifty-mile radius of the respective cities "in business of manufacturing," the annual premium savings for *minimum* liability coverage is seventy dollars for one vehicle. The Dallas citizens' group does not claim all the credit for the lower rates, but it does point out that sound and consistent public backing of official traffic programs can save insurance money.

In a similar way, many newspapers have performed a public service by presenting the economics of traffic accident insurance costs to their readers. The *San Francisco Examiner*, in an excellent three-part article this year, noted that basic automobile insurance rates in San Francisco are "thirty-three-and-one-third percent higher than in Los Angeles," then explained the reasons why.

The *Los Angeles Examiner*, at the same time, presented an enlightening series on insurance and concluded that traffic accident costs are too high in Los Angeles, as elsewhere, and that it's up to the driver to keep insurance premiums down.

Companies Strive For Low Operating Costs

No one, least of all the insurance companies and the state insurance departments, likes to see rates go up. Roughly three-quarters of the families in the United States own at least one car and the great majority have insurance coverage.

Insurance companies strive to reduce operating expenses to keep costs at a minimum for policyholders. Volume processing and mechanized operations help reduce the cost of handling the staggering quantity of figures, policy forms and records that every insurance company is required to maintain.

In addition, a built-in ceiling for rates is afforded by the high degree of competition within the industry, from both price and

service standpoints. Reflecting insurance companies' concern for the price of their product, Vestal Lemmon, general manager of the National Association of Independent Insurers, an association representing 300 firms, recently noted:

> "In the production and distribution industries, the only major cost items are labor, raw materials, and overhead. These change only because of variations in supply and demand and the inflationary cycle. Increases in labor and overhead costs hit the casualty insurance companies, too. But the companies are at the mercy of additional forces which they can neither predict nor control, and which bear little relation to general economic trends."

Mr. Lemmon designates changes in the styling of cars, and higher jury awards, as the uncontrollable and principal reasons for insurance company losses.

Complex Designs Compound Repair Costs

The vaulting cost of car repairs commonly receives much of the blame for raising automobile insurance rates. Automobile manufacturers gear their product to the public's taste, and people have demonstrated a preference for beautiful cars.

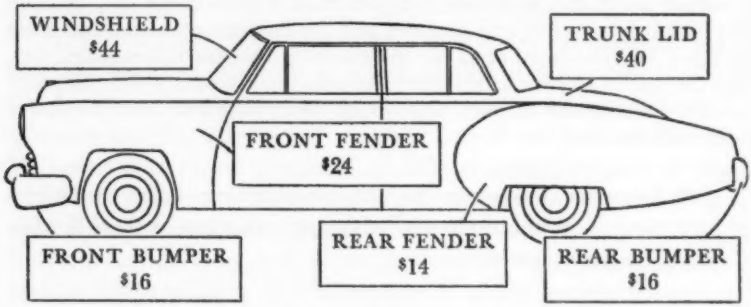
Fancy bumpers and grills, built-in headlights with multiple lamps, elaborate rear decks, sweeping fenders, extensive ornamentation all are part of the trim. One result is that yesterday's minor sideswipe can result in major repair costs today.

Ten years ago, a stone through the windshield of one of the lower-priced cars caused about a $15 loss. A 1958 model wraparound, which does improve vision, can cost more than $100 to replace. This is an increase of 567 percent or more, compared to a twenty-six percent inflation in our general economy as reflected in the consumer price index. An owner of a high-priced car pays $190 for a new windshield. One year ago, it was $97.

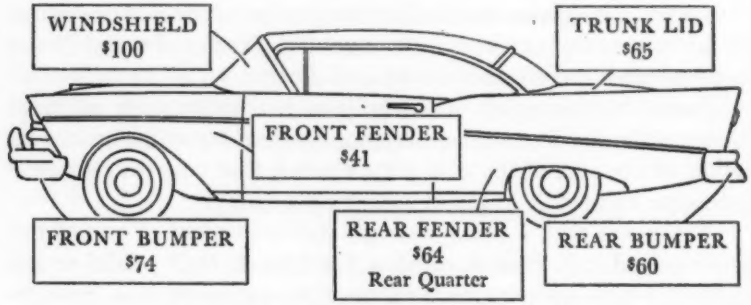
Front and rear fender panels have deep, sculptured designs, and high ridges in the metal. It takes a skilled metal worker to repair small damage. Major damage is almost irreparable. It often costs more than $100 to install new panels in cases that meant $30 fender repair jobs three or four years ago.

A study shows that anyway you look at them, repair costs are up on all popular cars. A combination of ten commonly damaged parts on one 1947 model cost $307, including labor, to repair that year. Comparable parts and labor on a 1957 model cost $845. Power

Increase in repair costs.



Composite of lower-priced popular 1953 models with price tags showing replacement costs.



Composite of lower-priced 1958 models with replacement costs.

brakes, power steering, intricate engines and transmissions, air conditioning are more expensive to repair. Shortage of skilled mechanics results in longer repair delays and higher charges. The American people have been willing to pay for these improvements in their new cars. The public easily can understand, too, that they are more expensive to repair and add to the cost of insurance.

By no means can all of the climbing repair costs be attributed to more stylish designs or complex, functional improvements. Increases in factory wages and metal prices also figure in costlier automobile parts. For example, the front fender for a 1953 car cost $24.37 in 1953. Today the same fender for the identical car costs $34.85, a forty-two percent rise. A similar inflationary trend prevails throughout the car. The cost of replacing eighteen major parts on one popular 1953 car in 1957 was up forty-one percent over 1953 prices. Labor costs for repairs, averaging approximately $3.00 an hour in 1953, now have increased fifty percent to approximately $4.50.

Repairing People Costs More, Too

The price of compensating injured people also has skyrocketed. With the increased volume of traffic the number of claims, legitimate and imaginary, has risen correspondingly. Every element of cost in compensating these claims has been subject to inflation. Medical care in general, doctor bills, and hospital treatment all have grown more expensive. This affects the amount insurance companies pay under bodily injury liability coverage when their policyholder is responsible for an accident. It also affects claims under medical payments coverage for the insured and occupants of his car.

United States Department of Labor indexes reveal that by the first quarter of 1958, hospital room rates had risen 91.8 percent from the average cost in the years 1947–49. Physicians' fees rose thirty-six percent in that time. New and improved medicines cost more, too. The man unable to work during the period of injury loses more money today because of pay scales. Claims for loss of income also go up as his salary goes up.

One major insurer reports the claim-cost for bodily injury in 1957 was fifteen percent over 1956 figures. A spokesman for another automobile underwriter noted that in 1951 their average paid bodily injury claim was $293. In 1955 it became $517. This advanced to $603 in 1956 and went over $700 in 1957. The public also has become more claim conscious. Personal injury claims per 1,000 accidents are rising. One of the largest companies reported one-third more personal injury claims per 1,000 accidents in 1957 than in 1954, despite a decrease of passengers per car.

Juries, increasingly each year, are awarding unprecedented amounts to persons suing for personal injuries suffered in an accident. Exceptionally high jury awards have made headlines. What is not made clear is that the money comes out of the insured's pockets. Verdicts go far beyond today's inflated living costs. In 1940, in New York State, the awards averaged less than $3,000. In 1957, the average was more than $11,000, an increase of approximately 265 percent. In certain areas, the average verdict for plaintiffs has gone up as much as 486 percent. Yet over the same period, the consumer's price index increased only ninety-nine percent.

Public Pays For Higher Jury Awards

Awareness of these facts recently caused the Chief Justice Roger L. Dell of the Minnesota Supreme Court to note that courts have a duty to exercise care lest a "fatal financial burden" be imposed on insurance companies through unusually high settlements by jury verdicts out of sympathy for the plaintiff. An attitude has developed to the effect that if the defendant is insured, he will not be hurt by a large settlement. Some jurors fallaciously reason, "it is only the insurance companies that pay."

Each high award is cited to judges as precedent for many more, and those in turn for still more. The chain reaction mushrooms. Newspaper accounts of lawsuits seeking huge amounts give prospective jurors the idea that personal injury suits automatically call for big figures. In some cases the jury has taken it upon themselves to award the claimant an amount in excess of his request. Recently, a jury suggested an award of $25,000 to a woman who asked for only $7,500.

Actually, few automobile claims get to court and fewer still are settled there. But judgments handed down by juries tend to set the pace on out-of-court settlements. Mr. Lemmon of NAII has said, "for every spectacular verdict we hear about, there are dozens of unpublicized cases where insurance companies . . . are induced to make substantial out-of-court settlements of legally weak but emotionally appealing claims, because of the devastating blow a 'runaway' plaintiff verdict could render to company reserves and assets."

We must be concerned, however, with more than the spectacular, high cost traffic accident. Even minor accidents can add up to settlements totaling thousands of dollars. Jury settlements, by all means, should be reasonable and adequate in every case. Many juries exercise splendid judgment in deciding on fair compensation for personal injuries. However, anything beyond a just award merely raises the cost of insurance for all autmobile owners.

Poor Drivers Pay Penalty

Automobile insurance is still a tremendous bargain. You never know when you might have an accident. Over fifty percent of the people killed in fatal accidents had never been involved in a serious accident up to that time.

If the present trend continues, the chances are that sooner or later, the great majority of drivers will be involved in some kind of traffic mishap. You might, for instance, go for four years without an accident. Yet an average property damage claim equals the entire insurance premiums for approximately seven years, without setting anything aside for the companies' necessary operating expenses. The average bodily injury takes about thirty-four full years of premiums to pay the claim.

Insurance companies are in business to pay claims. To keep the rates of all their policyholders as low as possible, they have every right to be selective in the risks they will underwrite. *The National Underwriter* Magazine notes that in the face of rising accident costs, "probably every insurer in the country is trying to be more selective." Evidence in the industry is that a growing number of motorists will be turned down.

Drivers that no insurer wants to cover are placed in an assigned risk plan, organized by the companies to provide coverage for these unwanted drivers. The plan parcels them out to the regular insurance companies. How many assigned risks the companies share depends on the volume of automobile insurance each writes. The coverage is limited in amounts, and rates for those with violations on their records are much higher than other motorists pay.

There are various categories of assigned risks. Not all are poor drivers. Certain young drivers, for instance, primarily because of

the poor record of their age group, may have difficulty obtaining insurance without going to the assigned risk plan. Those without violations pay the same rate as those who are not assigned risks.

However, a large number of accident-prone and otherwise unfit drivers are among the assigned risks, and these persons should not be licensed to drive. A driver's license is a privilege, not a right. A person who is unable to earn a license should not be entitled to drive. Under such circumstances he would not require insurance and rates undoubtedly could be kept at a lower level.

Strengthened driver-licensing laws will reduce accidents and lower insurance costs by removing unfit drivers from the road. In Illinois, 46,000 drivers were assigned to insurance companies under the assigned risk plan in the year ended June 30, 1958. This is an increase of 5,000 over the previous year. In New York state, the assigned risk pool has grown to 210,000 or more drivers.

E. R. Haffner, manager of the Washington State assigned risk plan, who has seen thousands of poor drivers from a vantage point, has some personal observations on traffic accidents and violations: "We need . . . driver training in the schools, an increase in the minimum licensing age to 18 and better enforcement with more rigid penalties. There's going to have to be a drastic change in our thinking. . . ."

Turning careless young drivers loose with a driver's license after violations is "worse than turning a careless kid loose with a deer rifle," Mr. Haffner believes. "Most of the time he can hit only one person at a time with a rifle, but there's no limit to the number he can kill with a car. Fines don't mean anything. Are we faced with mandatory jail sentences to put enforcement across?"

Insurers Are Accident Prevention Leaders

Inflation and the other factors which force prices up can't affect the accident that doesn't happen. The best way to keep rates down is to reduce the number of accidents. For years, the insurance industry has provided substantial leadership in working for strengthened driver licensing, effective state and local public support organizations, better law enforcement, uniform traffic laws, more adequate

roads, as well as establishment of more high school driver education programs.

The Allstate Insurance Companies are taking part in industry accident prevention efforts through the Allstate safety crusade. Through the crusade, people everywhere are being invited to pledge themselves and their families to safe driving. They also are encouraged to join or form local citizens' safety groups.

This is the grass roots approach recommended by President Eisenhower and implemented by his committee for traffic safety. "The really big job here is to mobilize public opinion and support of both reasonable and necessary action," he said. Safety officials acknowledge, that to discharge their responsibilities, they must have public understanding and co-operation. In short, the crusade is a countrywide program intended to add the essential ingredient of citizens' participation to the company's long established accident prevention efforts.

During 1958, the Allstate Foundation and Allstate Insurance Companies made grants to thirty-eight colleges and universities in the United States and Canada, helping 1,500 high school teachers qualify as driver training instructors. They are teaching approximately 90,000 young people and adults the skills and attitudes of safe driving during the current school year. Since the Allstate college grant program was initiated in 1953, grants have totaled $460,000. High school instructors trained by the college programs have taught, in turn, more than one million students in safe driving.

The company is a major source of safety literature, annually distributing approximately four million Allstate-produced accident prevention pamphlets. These are made available to individuals, traffic safety groups, schools, and other community organizations. Substantial grants-in-aid have been made for many years to organizations working to improve traffic engineering, enforcement and education. Groups currently receiving such assistance include the:

American Association of Motor Vehicle Administrators; American Bar Association's Traffic Court Program; Automotive Safety Foundation; National Safety Council; National Committee for Farm Safety; National Highway Users Conference; Northwestern University Traffic Institute, and other similar groups striving for better, safer highways.

Developing citizens' support for traffic safety, the crusade issues a continuous stream of public service news releases. As a result, 15,240 of these educational, informative traffic articles appeared in newspapers and magazines during 1957, reaching countless millions of readers.

Allstate Crusade Gains Public Support

Last year, Allstate continued personal participation in the crusade. They made 1,360 safety talks and screened 1,400 films for school, church, civic and other community groups. The crusaders took part in many radio and television shows. They worked on hundreds of local, state and regional safety projects, including the formation of citizens' groups, youth conferences, vehicle checks, and other programs.

A further move to promote safety is the rate discount to Allstate policyholders who have seat belts installed in their cars. A reduction of fifteen percent in premiums is offered persons on combined medical payments, death and disability coverages. This inducement is to encourage installation of seat belts, which greatly reduce the chances of death and injury.

In addition to the grants for driver education described above, most automobile insurance companies have demonstrated their belief in the value of driver education by offering lower insurance rates to trained young drivers. In doing this, the companies have helped convince the public and the educators of the efficacy of this vital training.

An Action Plan for Drivers

The public can take constructive steps to help reduce the cost of car insurance. Here are five suggestions addressed to the average driver:

1. Resolve to improve your own driving habits, by driving defensively to avoid the careless acts of others. Approximately eighty-five to ninety percent of accidents result from human error.

2. Join in or help form local safety groups or programs. As each area has a rate based on the accident record of people who live in the community, your efforts to reduce accidents will also reduce your insurance premium. By supporting your officials, the people of

the community can help increase traffic safety awareness, decrease accidents noticeably, and work for smoother traffic flow. This is happening in cities large and small across the land.

3. Take an interest in the awards made in your local courts. They should be fair, neither excessive nor inadequate. As indicated, unreasonably high awards are an important factor in forcing up the cost of insurance.

4. If your high-school-age son or daughter drives, be sure he or she passes the driver training course in school. If your local high school does not offer driver education, encourage it to do so.

5. Keep your car in good repair and in a garage. There, the chances of having it damaged or stolen will be measurably reduced.

Much more than insurance premiums is involved. Rising rates are only the barometer of the accident trend. The big loss is in the 38,000 to 40,000 annual deaths and 1.5 million other casualties, the families bereaved and the bodies crippled. The loss is in time, talent and productive ability wasted. The economic loss, itself, affects everyone. Public tax money must be used to pay for accident investigations, court time and jail sentences. Payment for property damage, legal, medical, surgical and hospital costs and loss of income due to absence from work adds up to a depressing drain on our country's strength.

Put in another way, if the economic loss resulting from the automobile accidents in the United States last year had been averted, the saving could have financed 190,000 new school rooms, or new hospital facilities to accommodate 260,000 patients. The economic potential wasted in 1957 automobile accidents could have financed about 500,000 new family homes. It also could buy clothing for half the population of the nation for the year, or a day's supply of food for every person in the world.

Drivers Set Their Own Rates

With so much at stake, the public should be reminded continually that it is in everyone's interest to help save lives, prevent injuries and lower the economic cost of highway accidents. It cannot be stressed too strongly, that careful driving is the most important factor in achieving these goals, and of lowering insurance costs. In-

surance company rate-makers really don't make rates at all. They merely gather the facts and figures of accident experience and costs, and from these determine how much they must charge in your community to pay claims and meet the expenses of doing business.

The insurance companies will continue to work hand-in-hand with traffic safety officials everywhere. Being closest to the distressing accident situation, traffic and insurance people fully realize the impelling need for counteraction by all the people, the companies and the communities in the land.

Our efforts will be most effective when we convince Mr. and Mrs. American Driver that they not only are the most effective life savers and accident preventers, they also are their own insurance rate-setters.

Municipal Parking—Detroit

J. D. MCGILLIS

When the new Parking Authority was formed in Detroit in 1948, Mr. McGillis was named Director. His background includes several years in the field of business systems with the Burroughs Corporation. He was Deputy Regional Director of the War Production Board and served in that capacity at the first meeting held in Detroit between government and the heads of the automobile companies to plan the reconversion of the automobile industry to peace-time production. Mr. McGillis is chairman of the American Municipal Association Committee on Parking and a member of the Highway Research Board Advisory Committee on Study of Parking and its Relationship to Business. He is a member of the Board of Consultants of the Eno Foundation, Saugatuck, Connecticut.

THE American Municipal Association, the organization of State Leagues of Municipalities and 13,000 American cities, adopted in 1953 a statement of policy on parking. In part, the statement read:

> The provision of parking places off the street, in the motor age, has come to be regarded as a legitimate, expected and necessary municipal service. For the welfare, safety and convenience of its citizens, and to insure its own future existence, each municipality must accept the responsibility for definite action which will result in the furnishing of adequate, permanent parking facilities at reasonable rates.

At that time, many cities had made real progress toward solving the parking problem. Most of the larger cities, however, were struggling for relief from traffic congestion and costly shortages of off-street space for the storage of automobiles, particularly in the central business districts. Some had already determined a course of action. Others were debating the form of municipal organization to carry out a parking program.

Which type of municipal organization is best for developing and administering a public parking program? Will a separate corporation, such as an authority, independent of direction of elected officials, obtain better results than a commission operating under a mayor and a city council? Should the traffic departments or the

police, who must enforce regulations, be given the job because of their day-to-day contacts with the motoring public?

Answers to these questions will be as divergent as the answers to, "What is the best kind of facility to solve an off-street parking problem?" Among the larger cities, two of the most successful are Pittsburgh and Chicago. Pittsburgh operates through a public parking authority, separate and distinct from the local government. The Parking Authority of Pittsburgh is a corporate body, authorized by law to plan, design, locate, acquire, hold, construct, improve, maintain and operate, own and lease—either as lessor or lessee—land and facilities at reasonable rates determined by it . . . to borrow money, to make and issue bonds and to secure the payment of such bonds or any part thereof by pledge or deed of trust of all or any of its revenues and receipts. . . . The five members of the Authority are appointed by the mayor to serve at his pleasure, without compensation, for five-year terms. They have independent authority to carry out their responsibilities. By all accounts, they have done an excellent job.

In Chicago, the parking program was established within the existing framework of municipal government, and its administration conducted in the same manner. Finance is handled by the comptroller. Design and construction is the responsibility of the department of public works. The parking division of the bureau of traffic and parking, a part of the department of streets and sanitation, is in charge of administration of the program. These departments operate directly under the mayor and the board of aldermen. The latest annual report of the City of Chicago Division of Parking and reports from other sources indicate that this metropolis has done an outstanding job in providing off-street parking facilities in the central business district and in outlying areas.

Many of the smaller cities also have had unique success. Some used the authority method, while others credit their accomplishments to efforts of a single determined individual: a city manager, a mayor or other official given the assignment and the authority to carry it out. There are numerous examples of this kind. One that stands out is that of Ann Arbor, Michigan, where the mayor, although insisting that a team job was the reason for fine results, nevertheless is the man who, recognizing the need, was able to enlist

the persons, in and out of government, necessary to create fine parking facilities. It undoubtedly was a team effort.

Detroit's Citizen Board

Detroit chose a method in between the two large city examples cited. By city ordinance, the responsibility for parking was delegated to a four-man citizens' board appointed by the mayor. This board was empowered to engage a director and necessary staff. Staff appointments are subject to the requirements of civil service. Salaries are approved by the common council. While the department was titled, Municipal Parking Authority, it is actually a commission. It can make investigations and analyses; can call on other departments for a reasonable amount of assistance, and can make recommendations to the mayor and the common council as to the number, type, and location of facilities to be constructed. It can manage or operate these facilities when and as they are completed. The mayor and common council have final approval of all projects.

This type of organization has worked well in Detroit. The caliber of citizens appointed to the four unpaid positions on the authority was such that it tended to bring about public acceptance and offset the usual charges of socialism, political expediency, inefficiency of government and similar accusations used by parking lot operators and others in an endeavor to maintain a parking monopoly. When things became really difficult for the struggling new department, and lawsuits were a common method of causing year-long delays, the citizens' board made it easier to attract the support of citizens' organizations in a move to have the Supreme Court of Michigan ban nuisance lawsuits. Several citizens' associations hired counsel and joined the city in its successful plea for a Supreme Court injunction and mandamus.

Pittsburgh, Chicago, and Detroit have each used a different type of organizational approach. None of these might be suitable for a particular municipality. Each community must make its own determination as to the kind of organization that will best serve its purposes. The key to success, regardless of the type of organization, is a clear-cut establishment of responsibility and the delegation of the necessary authority to carry out the responsibility. The danger

of operating through an existing municipal department is that regular activities in the department may demand too much of the time and attention of the personnel. When this happens, parking is not given the emphasis it requires. Generally, best results can be obtained by making solutions the sole responsibility of a separate corporation, a commission, or a department head reporting directly to the highest level of government.

The form of organization having been established, the Detroit municipal parking authority, embarking as a new department into a new field, as one of its first decisions had to determine the qualifications of the director. Members received advice to the effect that the problem was primarily engineering and they would do well to obtain the services of someone proficient in that field. Their decision, however, was that the department would best be served if headed by a man with administrative experience.

It is well established that the three principal phases of the parking problem resolve themselves into legal, finance, and engineering fields. In planning and programming, it was necessary for the authority to have the advice and guidance of the corporation counsel. This office supplied able men who assisted in drafting the necessary legislation and were able to defend it through several court trials. The authority, working closely with the city controller and private financial institutions, adopted, as a method of financing, a self-supporting automobile parking system. This included off-street and on-street parking, with funds raised through the sale of revenue bonds and to be repaid solely from the income of the system.

In the engineering field, strong reliance was placed on the recommendations of city traffic engineers and outside consulting engineers. City planners were included in all studies and no action was recommended to the mayor or the common council without city plan commission's formal approval. Later, the department hired for its staff the traffic engineer on loan from another city department.

The initial program for central business district parking and parking in the outlying major business districts was developed by the municipal parking authority, assisted by staff members of the city plan commission, the department of streets and traffic and other city departments. The parking authority directed and co-ordinated

the work of other departments, holding their interest by creating a desire to work toward the consummation of a worthwhile parking program.

Parking Authority Responsible for Management

When the planning had been completed, approved by the mayor and the common council, and a program established, the staff of the parking authority was enlarged in preparation for construction and operation. In addition to a director and an engineer, the services of an administrative assistant and an accountant were obtained. These men, constituting the staff of the authority today, are responsible for managing its operations including its garage and parking lots. They also continue to work with the department of streets and traffic and the city plan commission to the end that additional facilities will be planned and ready as future demands dictate. This requires regular examination of the problems of the central business district, the major outlying business districts, industrial areas and other special situations.

The department of streets and traffic makes surveys which the three departments believe necessary. The city plan commission has completed a comprehensive industrial survey in which the parking authority participated. This has resulted in the city government's placing increased emphasis on industrial problems. A citizens' committee has been appointed by the mayor with representatives from all segments of the community. Industrialists, bankers, labor leaders and others meet regularly to examine the broad problem and to recommend action.

Employment of a full-time executive as director of committee activities has given to industry one office to which it can go with governmental problems, rather than to a number of departments. The first city-financed industrial redevelopment area has been delineated and funds have been appropriated to start acquiring property. Provision of adequate parking is part of the plan of redevelopment.

The city plan commission has also completed an obsolescence study of fifty outlying commercial areas. This study has assisted the parking authority in providing parking in districts needing it. In

planning for the future, the parking authority endeavors to keep a wary eye on the motorist, particularly to sense changes in his parking habits. While it is true that his first desire is to get his car as close as possible to his destination in the least possible time at the lowest possible cost, the motorist will use his legs as a mode of travel if the conditions suit his convenience.

This has proved true of the all-day or worker-parker in connection with a 600-car, three-level ramp type garage built by the authority at a location between an expressway and the main business section of the central business district. This garage, two-and-a-half blocks from the expressway, enables the motorist to park his car within a minute of the time he leaves the expressway. When leaving for home he is on the expressway within a minute of the time he leaves the garage. This has distinct appeal for motorists. A survey shows that 47.6 percent of parkers at this location walk more than 1200 feet to reach their destination. The structure was operating at capacity within two weeks of the day it opened. It has a waiting list of 140 applicants to become monthly tenants. On a parking rate of fifteen cents for the first hour, ten cents for each additional hour, sixty-five cents for all-day, and a $13 monthly fee, the annual net return has more than doubled the $43,000 predicted by the garage consultant.

Two of the authority's large parking facilities have convenient access to the expressways and three under construction are similarly related. Downtown streets will be relieved of the burden of carrying an estimated 1,500,000 cars they will park each year with a consequent reduction in street congestion. A liaison is maintained with the co-ordinator of expressways in the department of public works so that this program may be continued. Meetings with the co-ordinator and other interested departments are held to review expressway maps as they progress. Excess parcels of land are examined and those suitable for parking are earmarked for that purpose.

As it prepared to place its first units into operation, the parking authority decided to engage, under *management contracts*, firms already operating parking lots and garages. This method was considered preferable to making outright leases of the facilities or to employing its own managers and attendants. The authority believed it important for the city to be in the position of having complete

control of rates and standards of service. To an extent, these controls would be lost under a lease, no matter what safeguards might be written into such a document.

While the authority was aware of the guaranteed income a lease would provide, it realized that the lease would be only as good as the people who signed it. It anticipated what happened later in a large midwestern city, when a parking operator walked out on his lease. The capital investment in the facilities are public funds and the authority believes that if facilities are financially successful, the profits should go to the city, not to the operator with no substantial investment. Conversely, while it may be legally possible to hold an operator to a bad lease, it would not necessarily be proper to do so. Therefore, the operators are paid a fair management fee, including in some cases an incentive for good operation, with net profits going to the authority.

The authority was inclined to rely heavily on the experience of persons in the business. Even though it included managers with top reputations in the business, the authority soon learned that a requisite of success was the close supervision of the employed firms. As an illustration of this, it discovered that one of its lots had been left unattended for three days without the knowledge of the firm paid to see that an attendant was on the job. There was no provision in the operations of the firm for a continuing check to prevent this situation.

Another instance had to do with an automatic ticket dispensing machine developed on one of the properties. Prior to the opening of a new garage, a machine was installed to issue tickets to incoming motorists. The authority knew from experience that the machine could issue as many as eight to ten tickets a minute when the demand reached that peak. However, the operating firm, with a background of twenty plus years in the business, was convinced that the machine would hinder the operation. They insisted that their normal method, which provided for a man to stamp the ticket in an electric clock and hand it to the customer, was preferable. For about two months, the operators asked for removal of the machine. Today they would not permit the machine to be taken out. The manager of the structure proudly states that it is probably worth two or three men to him.

These instances are among many experiences that caused the

authority to conclude that it could not accept so-called "know how" at face value. It caused the authority to adopt a policy of intense management of the management firms. This is accomplished in a co-operative manner, without irritation to anyone. It is done by constantly and consistently visiting the properties and making its observations known to the management. As a result, there has been unusually good public acceptance of authority facilities, and good public relations for both the authority and the management firms it employs. In considering the operation of properties, the chances are that more efficient, courteous and profitable results will be obtained by reserving for the municipality, without qualification, all the necessary rights to correct faults and to insist on performance.

Problems of Insurance

One of the areas in which the authority found itself in uncharted waters was that of parking lot and garage insurance. It seemed impossible to find two people who could agree on anything on this important subject. The administrative assistant on the authority staff interviewed insurance agencies, attorneys, the state insurance commission and others before it was possible to establish proper insurance policy standards. The insurance experience spans everything from building operation and fire insurance to garage keeper's legal liability, robbery, etc.

One of the authority structures was designed in connection with an auditorium. In questioning the premium for fire insurance it was necessary to examine closely the rating placed on the garage and the reason for the rating. It was learned that when the buildings were designed, no provision had been made to separate the two structures, as required by the code. Through a small expenditure of funds, changes were made to meet the code requirements, and the authority was able to reduce its annual insurance premium by more than fifty percent. The complexity of the insurance phase of parking operations can be measured, perhaps, by noting that in reply to an inquiry from another city, an eleven-page answer was written to cover all of the points.

The authority has established a system of daily reports on its properties, and a method of evaluating them. Detailed records are

kept on wages, employment, taxes, retirement funds, employees' hospitalization, uniforms, tickets, telephone, light, power, water, maintenance, supplies and management fees. A comparative record of average number of cars parked, turnover, wages per car, expenses per car, revenue per car space, and income per car space are among the checks maintained. The percentage of net income to gross revenue is carefully watched.

Through its controls, the authority is able to sense quickly any unusual change in operation. On one occasion, a defalcation on the part of the operator was uncovered and reimbursement obtained. Maintenance of these records and the preparation of monthly, quarterly, and annual reports on the financial and statistical operation are a necessary part of a properly functioning department and require the services of a good accountant.

The engineer on the staff of the authority, in addition to handling day to day problems in his field, should constantly be concerned with changing conditions and future growth. The authority engineer should also be active in long range planning. He helps conduct surveys as to location of sites for expanded operation and must assist with the layout and evaluation of these sites. As has been stated, several of the Detroit central business district parking facilities complement expressways bringing motorists downtown.

This type of planning pays off in convenience to the motorist, reduction in downtown street congestion, and a high rate of patronage of the facilities. The engineering and planning team work, starting early, particularly with the department of streets and traffic and the city plan commission, has been continued. Staff members from the three departments meet regularly to examine today's conditions, to estimate the needs of tomorrow, and to prepare plans to meet those needs.

The parking problem is not static, nor is its solution. A parking lot, adequate for the conditions of the day on which it opens, may need to be changed in a few short years. One of the authority lots, attended by an operator initially, has been converted to parking meter control. The flexible meter of today, taking nickels, dimes, or quarters and giving legal time periods for these coins, was not on the market when this lot opened.

After the improved meter became available and proved itself,

the authority switched from attendant operation to metered operation at a savings in operating costs. On another attendant-operated lot, there was a change in the business neighborhood between the time the lot was planned and the time it was placed in operation. Patronage on this lot did not offset operating expenses. In this case, a parking gate has been installed, and the facility shows a regular monthly operating income.

In conducting its operations, the authority has reached certain conclusions concerning specific phases of parking and parking facilities. Some are listed here:

Parking Garages

Design: The authority operates no mechanical parking structures. For its ramp and underground buildings, it has employed the services of people specializing in design and layout, to work with its architects. Recommendations made by these specialists should be checked and evaluated in the light of operating experience. In one instance, a turning movement within a structure was laid out by a parking operator designer in such a manner that it appeared the operation of the garage would be hazardous at that point. Fortunately, it was possible to provide for an alternative method of handling the traffic movement. When the structure was placed in operation, it was found that the initial design was not adequate and the alternative has been in use from the beginning. In the field of design, the odds are all in favor of getting a good structure, if competent consultants are employed. However, all designs and layouts should be carefully checked, and if there is a question which cannot be satisfactorily resolved, additional counsel should be employed to examine and recommend on the point.

Customer parking vs. attendant parking: From the beginning the parking authority has advocated customer parking and has had all of its structures designed accordingly. Its operating experience has strengthened its position in this regard, even though it recognizes that at some locations a small minority of motorists prefer that an attendant park their cars. Even structures with a per stall cost of $4,000 give a more satisfactory performance, and usually a higher net income, if designed for customer parking.

Elevators vs. escalators: Elevators are preferred. Cost, insurance and maintenance are less. Where two-way escalators are to be installed, the difference is considerable. If only up-escalators are used, there isn't the convenience provided by an elevator. Waiting time, in connection with elevators, does not appear to be an important consideration. Whether elevators or escalators are used, a companion stairway is a requisite. It has been found that some people cannot ride escalators. One Western parking garage, without a companion stairway, found it necessary to stop its escalator on occasions so it could be used as a stairway by those unable to ride escalators.

Directional signing: It seems almost impossible to secure an adequate supply of properly informative signs within parking structures. In this connection it seems literally true that many people see but do not read. It is not uncommon to have a motorist drive two levels into the ground to park a car and then seek out an attendant to ask, "How do I get out of here—do I go up or down?" The motorist has a mind occupied with many things. It appears that there is no danger of directional oversigning.

Pedestrian islands: Pedestrian islands are "out" in our consideration. Unless other costly precautions are taken, there is always danger of accidents from bumper overhang and in leaving the walkway areas. We believe the motorists, after parking their cars, should walk in the driving aisles where they all know, whether they are walking or driving, that this is where the pedestrian is to be expected.

Parking rates: There is a definite resistance on the part of the motorist to high parking rates. The recommendation of the American Municipal Association for permanent parking facilities "at reasonable rates" should be kept in mind at all times.

Right angle parking: Ninety degree parking should not be abandoned because of concern that customers cannot back their cars into parking stalls. If width of stall and driving aisle is adequate, this is not a problem with the average motorist. We use stalls eight-and-a-half feet wide and seventeen or eighteen feet deep, with a twenty-four-foot aisle. Where the layout lends itself to less than ninety degree parking, and traffic is not a problem, this method has some advantages. It is admittedly easier to park, and oftentimes the layout can be such that the opening of the front door on the driver's side will clear the bumper on the car next to it.

Capacity of garages: With all factors given proper consideration, capacity of garages does not have to be restricted to 400 to 600 stalls in size, as is often recommended. Concern about street congestion is too often unfounded. If the interior of the garage is properly designed and customer parking is used, street traffic problems do not occur.

Parking Lots

Attended lots vs. metered lots: Where the economics recommend an attendant-operated lot, it probably will have advantages over a metered lot. On comparable rate structures, the gross income for each car parked will be higher. Concern about motorists' cutting short their shopping time for fear of receiving a ticket for overtime parking, or concern as to their avoiding the lot because they do not have proper change to put in the meter, is usually exaggerated. The same motorists use a given lot over and over again. It does not take them long to learn to provide themselves with adequate coins before coming to the lot, and they generally allow themselves adequate time to complete their shopping mission.

Parking gates: Recommended where appropriate. They can operate twenty-four hours a day, seven days a week, and are effective at times when the use of an attendant is not justified or where enforcement of parking meter controls isn't profitable. They work well mechanically in all types of weather.

Blind parking meters vs. visual face parking meters: We have not as yet reached a definite conclusion as to which meter is better on an off-street parking lot. The blind meter will bring a higher income, because there is less tendency to gamble on unused time. On the other hand, if the meter is out of order and not giving the full amount of time paid for, the motorist can determine this before leaving the visual face meter, but has no way of knowing it in the case of the blind meter, and may receive an unwarranted overtime parking ticket.

Parking in outlying business districts: Detroit started comparatively early on a program of providing parking in major outlying business districts. Subsequent to the construction of its first such lot in 1952 a number of new suburban shopping centers have opened. While

some felt, or perhaps hoped, that the trade area of these new shopping centers would be confined to the speedily increasing suburban home growth, they have in fact had an impact on the urban shopping districts. Shopping habits have been changing for ten years and in many cases they have changed to quite a degree.

The automobile has come into use, more and more, as the means of conveyance from the home to the store. But all attempts to stem this tide toward suburban center shopping solely through the provision of off-street parking spaces are, in our opinion, due to be failures. An off-street parking space, on its own, will not bring a single customer to the merchant. Even in the new shopping centers, with their acres of free parking, it is not the parking which is the first attraction to the buyer.

The shopper is interested in the merchandise, the merchandising, in the price, in opportunity to make comparisons and in several factors that are placed before parking. The district with convenient parking facilities will outdraw the district without parking, but close examination will usually reveal that the average man or woman does not discontinue shopping in a given neighborhood or store only because of the inconvenience connected with lack of parking. He or she learns of a new store which is bright and attractive, which is well lighted, where the values of the goods offered for sale are more attractive, where the clerks are pleasant, the service is good, etc., etc. After trying it once or twice, the trips to the old neighborhood become more infrequent.

The following four case histories are part of our experience in outlying shopping districts.

Case History 1

A 360-car parking lot was established in a neighborhood area with comparatively new stores. The area is recognized for its alert and aggressive merchandisers and for its cleanliness and attractiveness. Despite the fact that it is within the orbit of one of the world's most successful suburban shopping centers, this district has held its own and has continued to prosper. The use of the parking lot has increased each year with an annual average occupancy in excess of

200,000 cars. The fee on the parking lot is ten cents for the first hour, five cents for each additional hour.

Case History 2

A 125-car parking lot was constructed in one of the older and larger districts also noted for its aggressive merchandising, and where a minimum amount of off-street parking existed. Through the years, property owners maintained a highly competitive spirit. This center has had all the competition which must be met by a center of its type; has had to contend, to an extent, with the adjustments of a changing population, but has managed to maintain itself at quite a high level. Patronage on the parking lot has diminished approximately ten percent from a peak reached three years ago. The fee on this parking lot has been ten cents for the first hour and five cents for each additional hour.

Case History 3

A 260-car parking lot was established in an endeavor to stop the decline of an important secondary major business area. The attitude of many of the merchants and business property owners was defeatist and, while the announcement of the coming of the parking lot was encouraging to several of them, quite a few with expiring leases were seeking new and more productive locations. During the twelve months between the announcement of the approval of the parking lot and its opening, several merchants moved out. Others were convinced that as soon as the parking lot was opened the vacant stores would be filled and the cash registers would be ringing again. After all, they reasoned, the population which the center served was still there and the nearest of the new suburban shopping centers was six miles away. The parking lot was opened with much fanfare by the brave band of retailers who felt convinced or were hopeful that the center would come back. But the shopping public stayed away.

After a year's operation at a parking rate of ten cents for the first hour and five cents for each additional hour, the parking lot did not produce enough revenue to pay the salary of the attendant. A park-

ing gate has been installed and it is now possible to park on the lot for ten cents for an unlimited period. This change has attracted the cars of a few of the merchants but has brought no additional customers. The future of the district is a big question mark.

Case History 4

One of the smaller secondary shopping districts, important enough to be listed as a major one under the city's master plan of land use, had no off-street parking. Provisions were made to construct an off-street parking lot behind business frontage paralleling the main shopping street. Pending completion of the permanent facilities, it was possible to construct approximately 110 off-street parking spaces immediately abutting the business establishments, which spaces could be used without charge. The competition from the newer centers has proved too much for this district. Many people who once shopped here are going elsewhere in spite of the free parking. Stores, including those with parking only twenty feet from their back doors, have become vacant.

In citing these cases, it is not intended in any way to indicate that adequate parking is not a necessary adjunct of the retail business. Rather, it is believed that these case histories emphasize an important point. Parking is one of the factors necessary to the success of a retail business. However, it is only one factor and it is not by any means the most important factor. It is necessary to give attention to many things in order to maintain a shopping district in an attractive, healthy, prosperous condition. Parking is definitely not a panacea.

When the Detroit automobile parking system was created it was for the purpose of making it possible for the city to provide parking where it was needed, without the use of tax funds. If an adequate job were to be done, it was felt that all locations would not be profitable. The good ones would have to help support the poorer ones. In practice this has worked out as predicted. Parking relief has been provided. Twenty-one permanent units are in use and under construction as a result of its operations. Plans are formulated to meet

future demands. Detroit will dedicate its third underground parking garage in about ninety days, thus becoming the first city with three large underground public parking facilities.

At about the same time, it expects to begin drawing the construction blueprints for its fourth underground unit, anticipating its need by 1961. The municipal parking authority, working with elected officials and with city departments and civic organizations, in looking back on the record to date, believes that the problems of the future will not be insurmountable.

City-State Highway Planning

W. F. BABCOCK

Mr. Babcock has been Director of Highways of the North Carolina State Highway Commission since July 1, 1957. He is responsible for a staff of 9000 and a road system totaling 7000 miles. He was previously Professor of Civil Engineering at North Carolina State College and Consulting Engineer for the North Carolina League of Municipalities. Mr. Babcock is a member of the American Society of Civil Engineers, the American Railway Engineering Association, the American Institute of Planners, the Highway Research Board, the Institute of Traffic Engineers, and other professional societies.

NORTH Carolina, ranking tenth in population with four-and-a-half million people, has, with increased industrialization, shifted its census constituents from ninety percent *rural* in 1900 to forty-two percent *urban* in 1950. It is estimated that by 1960, more than half of North Carolina's residents will live in urban areas.

This shift in population, induced by the growth of the state's textile industry supplemented by increasingly diversified economy —coupled with a rapidly growing recreation industry—has brought difficult highway and traffic problems. In the state's early development, small towns, created primarily as farm markets about thirty miles apart, grew up at crossroads or near railway stations. Agriculture, then, was the basis of the area's economy, tobacco the leading crop.

Today, North Carolina's rapidly growing cities are primarily in the 10,000 to 100,000 population class. They have not reached the point where complete traffic stagnation has taken place. Sound co-operative planning between the state and cities will, therefore, make it possible to develop street systems for highway and local use, constructed at a reasonable cost, in a manner to insure the prosperous growth of the area.

Previous to 1930, most of the rural secondary roads in the state were administered, built and maintained by the counties. During the depression, many counties found themselves unable to maintain adequately the roads under their jurisdiction. Therefore, the 1931 legislature placed all county roads under the jurisdiction of the state

highway commission for administration, maintenance, and construction. This added greatly to the highway commission's responsibilities. A summary for the mileage for which the commission became responsible follows:

A. Rural state highway system: 11,160 miles.

B. Rural secondary highway system (county roads): 56,615 miles.

C. Municipal, primary and secondary highways: 2,702 miles.

A total highway responsibility of 70,477 miles.

The total of 2,702 of municipal, primary and secondary highways in the urban area includes those numbered highways passing through the city as well as many secondary road connections that tie into the through-numbered routes. This system in mileage, larger than the total mileage of the fourteen largest cities in the state, represents almost forty percent of the street system within the corporate limits of the cities.

By legislative act, one-half of one cent of the gasoline tax a gallon is returned to the municipalities for improvements of streets in the urban area not on the highway system. This amounts to almost seven million dollars a year. The 2,702 miles of primary and secondary roads in the urban area are maintained and improved by the state highway commission with its maintenance and construction funds. Although the state maintains and constructs its urban roads in the city, the cities have jurisdiction for the operation of these routes including such items as signalization, channelization and other traffic engineering operations.

Because of this joint relationship and the high mileage of state highway streets in urban areas, it is axiomatic that city and state must work closely together if an economical and practical system of highways is to be developed to serve state highway traffic through the city, traffic moving into the city and the local traffic. When new routes are constructed or present routes reconstructed within the corporate limits of the city, legislative act requires that the city pay twenty percent of the right-of-way costs, the state highway commission, eighty percent of the right-of-way costs, and that the state highway commission pay the full construction costs with the exception of the removal and changes in urban utilities.

In the past, the lack of co-operative state and city planning has brought about premature highway obsolescence. One of the most important examples of this has been in the construction of bypasses within the urban areas. Failure to plan the land use along the bypass and the failure to secure adequate rights of way and reasonable control of access has made many of these bypasses obsolete within a few years after their construction. In several instances it has, therefore, been necessary to bypass a recently constructed bypass because of this lack of land-use planning and roadside development control.

Obviously, such practices waste limited available construction funds and injure property values and development in the cities. There also has been a tendency to assume that the urban problem could be solved by a bypass. A small portion of the total traffic may be removed by such construction, but the bulk of the traffic volumes in most cases has continued to enter the city on the highly congested urban streets. It is apparent, therefore, that the cities and the state must now work in harmony to develop the more important routes carrying traffic from the outer suburban and rural areas into the cities as well as bypass routes to carry the through-traffic around the cities, and circumferential or loop streets in cities for internal city traffic distribution.

Proper development of the major radial routes into the cities is of prime importance and will require the utmost in co-operative planning. Because of existing narrow rights-of-way and high costs of obtaining necessary rights-of-way for new facilities, available funds do not permit the reconstruction of all of these urban arterial highways immediately. Therefore, plans for thoroughfare construction must be made for the future with the city and the state working co-operatively in the acquisition of necessary rights-of-way for the proposed facilities at a time when the properties involved have not been developed fully.

Obviously, it is not possible to know where these new highways should be and how they should connect with other major urban streets unless some finely detailed form of planning has taken place. Actually, the planning of highways in the urban area is even more desirable and necessary from the cities' point of view than from that of the highway commission. The location of highways in urban

areas—in fact, the very existence of highways—can profoundly affect the cities' development. It should be insured that the impact on cities is beneficial, not detrimental.

Advantages of a Master Plan

Development of the interstate highway system, bringing changes in the transportation pattern, will accelerate the shifts in population more rapidly than in the past. Similarly, major primary route improvements will also have a profound effect on the urban development pattern. A well conceived city plan, if followed, can help the cities attain greater advantages from highway construction. The proper planning of the city should be based on a master plan, often called a comprehensive city plan, which embraces all of the elements of the plans for the orderly growth and development of the city. These include the future land-use plan, public works or community facilities plan and the fiscal plan (most notably the capital improvements budget part of the fiscal plan) and the thoroughfare plan.

This master plan must provide first for a balanced, attractive general design; second, be suited to present and future needs of the city; third, be in keeping with the economic and population outlook of the city; fourth, be in line with the community's financial resources for carrying it out and finally, it must be attuned to community sentiments and values. The comprehensive plan also has the duty of suggesting to the community new ideas for its development and function. To achieve the master plan of the type outlined above requires a considerable application of scientific and artistic effort.

A large body of facts about the past as well as the present must be gathered and analyzed. Intelligent estimates must be made about the future based upon past performance and foreseeable changes. The scientific effort mentioned above requires several complete studies, including the urban economy, employment, population, urban land studies and the transportation system as related to present and future land use. The thoroughfare plan, which will attempt to solve the state highway commission's highway needs in the area as well as the local street needs in the area, must be developed jointly with the projection of future land uses after these basic fact-finding studies are completed and must be worked out jointly by the highway commission and the city.

Assuming for the moment that such plans are worked out in the community, this planning cannot stop with plans. Their effectuation should be brought about by the city through several devices, including the zoning ordinance as derived from the land-use plan, which divides the city into districts for the purpose of regulating the use of the land and buildings, heights or bulk of buildings, the proportion of a lot that may be covered by them and the density of population. This zoning ordinance has a particular significance for thoroughfare planning in that with it future traffic volumes and types of traffic may be anticipated.

In addition, the cities must develop adequate sub-division regulations to guide the development of sub-divisions in terms of standards for street alignment and width as to conformity with the major plans. It is through appropriate sub-division regulations that adequate rights-of-way can be developed over the years for future state and city urban construction. In addition, if the thoroughfare plans are to be practicable and workable, the city should develop adequate future street line and driveway ordinances and must ultimately operate the future highway system in an efficient manner. The cities must finally work with the highway commission in other types of planning control which will limit and control the access on major thoroughfares carrying traffic into and out of the cities.

Although the highway commission has not the power to undertake complete planning programs in cities, it realizes that the best results in thoroughfare planning can be achieved through such programs and it will strongly urge communities to undertake them.

Most of the larger cities in the state have complete planning programs of the type described above and employ a professional staff. Some of the smaller cities employ consultants or at least have planning commissions and many of them have zoning ordinances. Only a few of the cities have qualified traffic engineers and persons qualified in the design of thoroughfare systems. In these cities the highway commission will work closely with the local planners and traffic engineers in order to facilitate this.

Several changes have been made in the state highway commission organization. The first of these is in the traffic engineering department. Three area traffic engineers have been added to the staff to work closely with the municipalities concerning traffic problems on the urban highway system. These area traffic engineers will

make recommendations for more efficient operation of these systems when requested by the cities. In addition they will make studies with the cities on local traffic engineering problems. In general, the work on the system streets is provided free of cost to the cities for routine traffic operations. Specialists in signalization will also be added to help the cities at their request.

For major traffic engineering studies in the urban area which involve not only the system streets but other urban streets, an arrangement has been worked out for these studies whereby the state highway commission will bear seventy-five percent and the city twenty-five percent of the cost of these studies. This service is available to the cities upon request through the state highway commission with the full understanding that the responsibility for the operation of the system streets by law is vested solely with the cities except for parking regulations which may be passed by ordinance by the state highway commission. It is hoped that the addition of these qualified traffic engineers will be able to improve the operation of the highly congested urban street system. Their purpose is to aid the municipalities and not to supplant traffic engineers as full time employees for the larger cities.

North Carolina's Advance Planning Unit

Traffic engineering can only make the best use of the existing street system and this system will be running to capacity within a few years. A major revision in thinking is directed toward long-range planning worked co-operatively with the urban areas. In order to develop this co-operative arrangement the North Carolina State Highway Commission has developed an advance planning unit within the planning department. It has also greatly enlarged its planning department for the purpose of making additional surveys. The enlargement of the planning department now makes it possible for it to undertake more detailed traffic analysis in the cities and to make more elaborate origin and destination surveys as well as other types of surveys needed for thoroughfare planning.

The advance planning department includes project engineers who make the preliminary planning and layout studies for all rural highways and urban highways. Within this advance planning unit are specialists in regional planning, in urban planning, and spe-

cialists in urban transportation problems. This section of the department is charged with the responsibility of developing an overall master highway plan for the state as well as working on local planning and transportation problems.

The urban planning section of this department makes continuing population studies of the various rural and urban areas to aid in understanding the growth pattern of the state. In addition the urban planner will work closely with the communities in the land-use and other comprehensive planning studies that will be beneficial to both the state highway commission and the cities.

The state department of conservation and development recently instituted a local planning assistance program that will distribute federal aid for planning in the small communities. The department also maintains a professional consultant service for small communities. In communities in which the department of conservation and development staff is developing planning programs, the highway commission's advance planning staff will work closely with it in preparing thoroughfare plans. The highway commission will bear seventy-five percent of the thoroughfare planning costs in such cases.

Where there are no planning programs in progress, co-operative studies with the municipalities of the state take several forms. One instance is a major study being undertaken with the City of Charlotte, making use of federal-aid planning funds and the employment of a consultant to make an overall thoroughfare plan for the greater Charlotte area. In this instance the highway commission is employing the consultant to work on the thoroughfare problems in co-operation with the highway commission and in co-operation with the planning department of the city to develop a thoroughfare plan based on the land development plans of the city. The highway commission bears seventy-five percent of the cost of the consultant with the city bearing twenty-five percent. The activities in this area are co-ordinated by the planning department of the state highway commission.

As a second instance one or two of the smaller communities are making use of the federal-aid planning funds for the development of land use and other plans. As these are completed, the advance planning department of the highway commission will work co-operatively with the local planning assistance program in developing the long

range thoroughfare plans based upon the data as developed by the community planning program.

In another instance the highway commission is working co-operatively with an entire county of the state which has employed a consultant to make an overall county-wide development plan. The highway commission will provide manpower from the advance planning department to work with the consultants to develop a long-range thoroughfare plan.

In other instances, the advance planning department will work directly with the community making use of federal-aid highway planning funds with the highway commission bearing seventy-five percent of the cost and the municipality twenty-five percent for the development of an overall comprehensive thoroughfare plan to serve the needs of both the highway and the local street systems.

Although this co-operative planning program has only been in existence approximately six months, and all of the formal procedures for co-operation have not yet been implemented, it appears to be well on its way to success. In the past, there have been major difficulties between the state and the city because the state has certain responsibilities in the city and is charged with the major *construction* costs whereas the city is charged with the *operation* of the facility. Too often the state highway commission has not been as cognizant of the municipal problems as it might have been. Similarly, the city in development has not been as cognizant of the state highway problems as it might have been. These co-operative thoroughfare planning studies will save the state and the city large sums of money, if cities will work toward the development of adequate planning controls to insure adequate rights of way and land development in an economic manner, and if the state highway commission will work realistically with these long-range plans developed over many years.

North Carolina's urban problems can be solved by this co-operative state-city approach that brings the two agencies of government in close harmony, each realizing its joint responsibility and the need for continuity of program if the transportation problem is to be solved. To this end, the highway commission is dedicated in the matter of long-range planning with the many urban communities of the state.

Radar in Traffic Enforcement

WAYNE W. BENNETT

Mr. Bennett is the Chief of Police at Edina, Minnesota. He joined the Albert Lea, Minnesota, police department and served seven-and-a-half years, resigning in 1952 to join the Minnesota Department of Civil Defense as Assistant Chief of Staff. He served in this capacity until 1955, when he was appointed to his present position. Mr. Bennett is presently an instructor for the International City Managers Association in Municipal Police Administration, and was co-author of the State Department of Civil Defense Police Training Manual. He is a member of the Senate Interim Committee on juvenile traffic problems, represented the Minnesota Chiefs of Police Association as legislative co-ordinator, and is director of Civil Defense for Edina, Minnesota. Mr. Bennett is a graduate of the FBI National Police Academy, Washington, D.C. He holds an LL.B Degree in law.

RADAR has been used for speed determination and speed control of motor vehicles for more than ten years. There has been widespread publicity on the use of radar and other electronic devices to check speed but there is still some resistance to this method. There can be little doubt that it is an effective and an accurate method of checking speed, from the police and public viewpoint. But radar, like all other means of speed determination, has its limitations. This article will discuss the enforcement of speed regulations in relation to the overall traffic enforcement problem.

Edina, Minnesota, has grown from a 1950 census of 9,744, to its present population of 26,000. It is a suburb of Minneapolis, at the southwest corner of the metropolitan area of Minneapolis-St. Paul, having an area of seventeen square miles. It is primarily residential, with a higher than average family income. There are three shopping centers within the community, situated in the northeast, southeast and middle north sections of the community.

The number of vehicle miles traveled within the limits of the community considerably increased with the opening in late 1956 of the Southdale Shopping Center in the southeast corner. One of the largest in the world of its type, Southdale includes a retail center of seventy-five stores, a large medical building, and other buildings planned.

Two main highways run the complete length and width of the community, carrying a tremendous number of vehicles each day, as they are the major routes in the metropolitan area traffic network. In this type of community, it is obvious that the principal problem for the police department is traffic, although we have our fair share of the services required of other police departments.

The Edina Police Department includes fifteen uniformed men, three civilian desk clerks, a detective sergeant and the chief of police. Traffic enforcement is performed almost entirely by the fifteen uniformed men, with the exception of personnel time devoted by the chief of police in determining and directing departmental traffic policies and the time spent by the clerk-dispatchers in performance of duties related to records of accidents, citations and complaints, filing, etc.

The departmental command functions are executed by the chief of police and five sergeants. Specialized training in traffic has been received through the local in-service training program, metropolitan area police schools, FBI-state highway patrol schools, the municipal police administration course taken by the five sergeants, the Northwestern Traffic Institute, and the Federal Bureau of Investigation National Police Academy.

The Edina police department owns and operates the electromatic radar speed meter to check vehicular speeds. It records the speeds permanently on the Esterline Angus speed graph chart. The charts taken from the Esterline Angus device provided the basis for determining the statistics used in this discussion.

Minnesota Speed Statutes

Speed limits are established by Minnesota state statute. No speed limit can be changed without the permission of the state commissioner of highways, either outside or within the corporate limits of a municipality. Under Minnesota law, all speed limits within a corporate municipality are absolute speed limits. The Minnesota statute relating to speed is as follows:

"Minn. 169.14, Subdivision 5. Speed zoning not on trunk highways. When local authorities believe that the existing speed limit on any street or highway, or part thereof, within their respective jurisdictions and not a part of the trunk highway system is greater or less than is reasonable or

safe under existing conditions, they may request the commissioner to authorize, upon the basis of an engineering and traffic investigation, the erection of appropriate signs designating what speed is reasonable and safe, and the commissioner may authorize the erection of appropriate signs designating a reasonable and safe speed limit thereat, which speed limit shall be effective when such signs are erected. Any speeds in excess of these speed limits shall be prima facie evidence that the speed is not reasonable and prudent and that it is unlawful; except that any speed limit within any municipality shall be an absolute speed limit and any speed in excess thereof shall be unlawful. Alteration of speed limits on streets and highways shall be made only upon authority of the commissioner."

Radar is used on streets that have high accident frequency; on streets that have a high number of persons injured even though the number of accidents is not high; and on streets where excessive speeds occur, as reported in complaints received from residents of the street. In some cases, complaints are found to be legitimate, though some are the result of chronic complainers who are often poor judges of speed.

The basic tolerance that should be permitted, according to some traffic experts, is five miles an hour. A five mph tolerance allows for mechanical and human error; any tolerance in excess of five is regarded clearly as an extension of the law. It will be noted from the statistics in this article that we have obviously permitted more than a five mph tolerance.

Tolerance is under present study and revision as a result of this statistical study. To determine the original base tolerance before an arrest ticket was issued, we used a street on which the eighty-five percentile speed and the posted speed limit were identical. We then considered what we thought was a reasonable tolerance for the base street. The eighty-five percentile method was used to determine the eighty-five percentile speed on all streets where radar was so used.

The tolerance was thus different on various streets because if the eighty-five percentile speed was higher than the posted speed, we raised the tolerance on this street; if the eighty-five percentile speed was lower on some other street, tolerance was lowered on that street. While this procedure was complicated, it was also fairer to the motorist because it is impossible to post speed limit signs for each block in exact accordance with traffic conditions in that block.

Signs have been posted on all streets entering the community, warning that the streets are radar patrolled. No other sign is used to warn drivers at the specific time and location radar is operated. The radar vehicle is an unmarked car but the radar unit is placed on the shoulder of the road or street where it is being operated. There is no attempt to hide or secrete the radar unit in the radar vehicle.

Statistics Obtained from Radar Charts

The following information was obtained from radar charts:

1. Number of locations checked by radar: 272
2. Number of department hours expended on radar enforcement: 425
3. Number of vehicles checked for this report: 132,232
4. Number of vehicles checked exceeding the posted speed limit: 29,132
5. Number of vehicles checked that were under the posted speed limit: 103,050
6. Number of vehicles between two to six mph, in excess of the posted speed limit: 23,689
7. Number of vehicles checked, in excess of the posted speed limit by more than six mph: 5,493
8. Number of speeding tickets issued by radar: 1,263
9. Number of speeding tickets issued by regular patrol during this same period: 544
10. Total number of speeding tickets issued: 1,807
11. Total number of tickets issued for all moving violations: 3,016
12. Percentage of total vehicles checked that received speeding tickets: .0095 percent
13. Percentage of vehicles over the speed limit that were issued tickets: .043 percent
14. Percentage of all tickets for moving violations that were speeding tickets: 59 percent
15. Percentage of all vehicles checked in excess of the posted limit: 22 percent
16. Percentage of vehicles exceeding speed limit that were in excess of the 2 to 6 mph limit: 82 percent

17. Percentage of vehicles exceeding posted speed limit that were in excess by more than 6 mph: 18 percent

During the operation of radar, other offenses, not directly related to speed, were encountered. The principal offenses detected while stopping speed-limit violators were: illegal equipment, illegal passing, driving after suspension, driving after revocation, driving in violation of restricted driver's license, and having no driver's license. The ratio of these offenses would have increased if sufficient manpower had been available to stop all vehicles exceeding the speed limit. With the available manpower, it is only possible to stop those vehicles in excess of the speed-limit tolerance that warrant arrest.

Other Related Studies

Other related studies, in addition to radar statistics, included residence of drivers arrested, records of drivers apprehended, enforcement index, and comparison of accidents by communities in the same population group:

RESIDENCE OF DRIVERS

(Three-month period only)

Residents	*Adults*	*Juveniles*	*Radar*	*Regular Patrol*
Edina	167	14	120	61
Metropolitan Area	383	12	262	131
Other Minn. residents	61	1	31	31
Out-of-state	11	0	6	5

Records of Drivers

The following table reports records of offenders arrested for speeding as a result of the operation of radar for the four months beginning October, 1957 and ending January, 1958:

Month	*Tickets issued*	*Number of violations on record*							
		None	*1*	*2*	*3*	*4*	*5*	*6*	*7 or more*
October	196	88	56	23	19	4	1	3	2
November	59	31	15	4	2	4	3	0	0
December	92	51	24	9	4	3	1	0	0
January	265	144	70	23	16	4	2	2	4
TOTAL	612	314	165	59	41	15	7	5	6

Of those having seven or more violations, four had seven violations; one had nine, and one had ten previous violations.

Comparison of accidents and their frequency in Edina and eight other cities with 20,000 to 40,000 population, during 1957, is as follows: (Statistics from Minnesota Safety Council report for 1957)

Community	*Non-fatal*	*Injured*	*Property Damage*	*Total*
Edina	105	165	211	318
Bloomington	140	208	232	373
Winona	101	136	291	394
St. Cloud	141	203	351	493
Mankato	128	188	389	519
Richfield	171	274	363	535
Austin	140	198	436	576
Rochester	175	232	599	777
St. Louis Park	214	311	577	793

Accident Experience

The accident-experience record in Edina over the ten-month period, in comparison with the same previous months of 1956–57, indicated a slight rise in the total number. Comparable comparisons cannot be made until the same ten-month period of 1958 is related to 1959, because of the great increase in growth and the opening of the large shopping center. The vehicle-mile travel increase has been notable for this ten-month period in comparison to the previous year ten-month period. It appears that there was a decrease in vehicle-miles traveled during the same ten-month period of 1956 and 1957.

Enforcement Index

The enforcement index is determined by the following formula:

$$\text{EI equals } \frac{\text{convictions with penalty for hazardous violations}}{\text{number of fatal plus personal injury accidents}}$$

Using the charts in this report, it is obvious that our enforcement index will be high. The International Chiefs of Police and the National Safety Council recommend an enforcement index of about 20. The enforcement index for Edina is about double this figure; however, both the Police Chiefs and the National Safety Council state that the index should be considerably higher in some areas.

The following observations and conclusions are the writer's opinions, based on the statistical analysis of the radar graphs and on experience with traffic law enforcement:

1. Prolonged observation and study of our radar graphs point out with some certainty that the driver arrested for speeding in Edina was not only violating the posted speed limit but was also an abnormally fast driver not only as to the posted speed limit, but in relation to other drivers proceeding over the same street and location at approximately the same time and under the same street and weather conditions.

The individual driver is not personally convinced of this because he sees only himself from a rather prejudiced viewpoint, but the graphs support this conclusion. A large percentage of drivers arrested through radar operation have previous arrests for speeding in this city or some other community. He is probably the driver of whom others would say, "I knew he would get caught sooner or later because he always drives that way."

2. Study of the radar graphs strongly indicates that predictions of the ratio of vehicles traveling within the various speed minimum and maximum brackets, on any street, may be made with a reasonable degree of accuracy, providing several hours of study of vehicle speeds on this street and several times of checks are obtainable.

For example: If traffic on 64th Street travels in the ratio of speeds indicated in the example below, in a 30 mph zone, the ratio of vehicles in each bracket will increase in direct ratio to the increase in the number of vehicles, proportionately:

0–10 mph	2 vehicles
10–20 mph	16 vehicles
20–30 mph	79 vehicles
30–36 mph	14 vehicles
36–40 mph	3 vehicles
Over 40 mph	1 vehicle

This ratio applies to nearly any speed zone, assuming the speed-zone determination is in accordance with the 85 percentile method of speed zoning. Different streets will have different traffic patterns but the proportionate number of automobiles within each bracket on any street and location will remain essentially the same within reasonable periods of time: that is, four hours in each time study, and over a period of months, unless something occurs to disturb the status quo—heavy increase in traffic, abnormal parking development, street surface construction change, consistent speed enforcement, etc.

There are some minor variations but it is possible to predict that, out of every one hundred drivers passing a point on a specific street, a certain number will fall within each of the speed categories mentioned above. It thus appears that there are drivers who are abnormal in speed habits and probably consistently so over long periods since they appear so regularly on the charts. It is this driver with whom we are concerned in speed control and enforcement. It is this driver who is being apprehended.

Drivers at both extremes—too slow and too fast—are dangerous drivers. The driver indicated to be too slow may have some excuse for his place on the graph, since he may have just turned off a side street a short distance from the radar location. Equally dangerous is the driver exceeding the speed limit by two to six mph, because he is the one who passes the motorist who attempts to stay at the limit, and the act of passing is dangerous if not *carefully* performed. This study indicates there were 23,689 of this type out of 132,232 drivers —about one out of every four.

Following this precise study of the speed habits of 132,232 drivers, it is safe to assert that regardless of the many excuses of the speeder, there can be in reality little sympathy for his cause, because he is an abnormal speed-habit driver in relation to his fellow drivers and therefore convicts himself. He may be the local lawyer, banker, doctor, real estate salesman, hen-pecked husband, domineered wife, factory worker, judge, or police officer. He may be driving an old or new car; he may be young, middle-aged or old. Tickets issued reveal that it makes little difference. He is an individual, fast-habit driver.

3. Many experts believe there is no direct relation between speed enforcement and the reduction of accidents. There is a direct relationship between consistent enforcement of any violation, including speed, and the number of accidents. There is no doubt that speed increases the severity of the accident once it occurs, whether speed was the direct, sole cause or in combination with other causes. Sporadic enforcement of any violation has little or no effect, with or without education programs. Consistent enforcement, with public education and improved engineering, will reduce accidents.

Every community that has attempted consistent enforcement, in sufficient degree to deter violations, comes immediately under

criticism of those apprehended. Their charges include "setting a speed trap," "wanting to build a new city hall," "the police officer receives his cut," or the officers are "ticket happy." Offenders believe the law should be enforced on everyone else except themselves. If the driver is apprehended for speeding, he will tell the officer he should watch those drivers going through stop signs; if the officer arrests a driver for going through a stop sign, he informs the officer that he should stop those drivers going by his house at "eighty miles an hour."

The story of the driver frequently varies from the facts because he naturally wishes to find some scapegoat for his own negligence. He does not like to admit his fault. However, if the police officer is honest—as most of them are—he has personally observed the driver committing the violation and wishes to report it truthfully. There is no traffic law violation in the moving violation categories that is more or less important than any other violation; in many circumstances, any violation, of itself or in combination with another, may cause death, personal injury or property damage.

This statistical study is the result of a speed survey, but there is a direct relation between the driver who speeds and an habitual violator of other traffic control measures. As evidenced by the driver records included in the charts, nearly all drivers with more than two violations, had offenses for speeding and other violations not related to speeding.

Enforcement of a consistent nature will have a related effect on the reduction of all moving traffic offenses through certainty of apprehension, though the primary emphasis may be on speed. The increase in the certainty of apprehension will cause not only the driver arrested but all drivers to be enforcement-conscious and therefore driver-violation conscious. At the present time the certainty of apprehension is not sufficient to deter bad driving; the calculated risk is so favorable that there is little deterrent.

Minnesota has two million drivers, ninety percent with clean records. This fact in itself is an indictment of the lack of enforcement, because certainly one would expect many more to have some mark against their driving record. As drivers, we simply are not that good. The public may not be willing to accept this degree of enforcement but there will be no substantial reduction of accidents

until enforcement officials accept the responsibility of efficient enforcement of all violations at all times, and until the community and community officials are willing to provide personnel and support for police departments to accomplish this end.

4. The stigma of enforcement could be largely removed by abolishing the outmoded system of punishment known as the fine. The fine system provides a scapegoat for the American public to accuse the enforcer rather than the violator. The driver's license has been clearly established by the courts as a privilege and not a right. All legal action against traffic violations should deal directly with the license, the privilege to have or not to have a driver's license.

The point system would decide at what point the license would be suspended or revoked except when the judge concludes that the violation before the court is sufficient to warrant immediate suspension. This method would result in hardship for some, but accidents and the results of accidents have caused greater hardship for many others.

Removal of the fine system would eliminate any accusation of enforcing laws purely for the purpose of revenue; because there would be no revenue. Arrests would be made in the interest of safety and safety alone. The justice of peace fee system lowered the dignity of the court; the fine system lowers the dignity of purpose and high concept of enforcement.

Architect and Traffic Engineer

WELTON BECKET

Welton Becket heads one of the largest and most active planning, architectural, and engineering offices in the world. He directed master plans for the new International Airport and the Bunker Hill Redevelopment Agency in Los Angeles; for the cities of Costa Mesa and San Leandro, California, and the Salinas (California) civic center. Other projects include the Quality Hill Redevelopment Agency in Kansas City, Kansas; the Penn Center in Philadelphia, Pennsylvania; the campus development and building program of the University of California at Los Angeles, and more than forty major shopping centers. Mr. Becket also planned Bullock's Pasadena (California) department store which established the post-war trend in store planning and brought the firm international recognition. His work has spread to an international base and includes design of hospitals, schools, office buildings, hotels, industrial buildings, stores, restaurants, and parking structures. Becket's achievement in the architectural profession has won awards both nationally and internationally, and in 1952 he was elected to Fellowship in the American Institute of Architects.

TO meet the needs of present-day clients, the scope of services that the large architectural firm must provide is continually expanding. Aside from traditional architectural design, working drawings, specifications, and construction supervision, many other services must be provided competently within the firm or through reliable specialists.

Individual buildings are becoming more complex. The continued refinement of materials and construction techniques, space planning, environment control, and special equipment for specific building types (schools, hospitals, office buildings, etc.), now requires a more thorough knowledge of their workings. Complete service in any one of these specialized building types calls for technicians with thorough knowledge of unique problems that each building poses.

In addition to increased building detail, the size and scope of projects that come to an architect's office vary tremendously—from the design of small interior furnishings, to the planning of an entire

new city. To carry them out successfully requires the integration of many specialists—engineers, designers, economists, planners, technicians and public officials.

Failure to give proper attention to any single aspect of a large project can mean an unsuccessful solution to the whole problem. Continuous emphasis, therefore, must be placed on teamwork and co-ordination. The specialist must make the architect and planner aware of new techniques, of alternatives, and of their implications. The architect must assume responsibility for selecting and modifying requirements of the various specialists to achieve an integrated solution. An end product must be derived that does the required job. At the same time, it must be pleasing to see and experience. This result does not imply any reduction of standards established by the specialists, but rather selection, among alternate solutions, of the scheme that best fits in with other aspects of the project in obtaining the best total solution.

The method of collaborating with traffic engineers or consultants varies from job to job. In some instances, a traffic consultant is retained on the staff of the architect or planner on a full- or part-time basis. The principal advantage of this method is that liaison becomes continuously smoother as each party becomes familiar with and sympathetic to the other's requirements.

In other instances, the architect or planner consults with the traffic engineer employed by a city or county and for whom, or within whose jurisdiction, a project is being developed. The advantage of this method, of course, is that the traffic engineer is familiar with local conditions, laws, etc., and can be of valuable assistance in avoiding pitfalls. Occasionally city planning and traffic engineering studies under independent contracts are prepared concurrently. This is the least successful method since collaboration must take place on a voluntary basis.

Seeking advice from traffic consultants and engineers by architects and planners, however, should not be a one-way street. On occasion, traffic studies have been undertaken by traffic consultants without proper collaboration with planners. Highway patterns exert a strong influence on land use, zoning, and the structure of land values. It is important, therefore, that the traffic expert, in the

course of his work, avail himself of the services of planning agencies and consultants.

External Circulation Patterns Important

One particularly important aspect of any architectural project is its external circulation—the means by which goods, services, and individuals enter and leave a building or group of buildings. Here the architect is concerned with the inter-relationship of several types of circulation patterns: pedestrian, automobile, truck, emergency vehicles, public transportation, and the loading, unloading, and movement of all types of transportable goods.

Tremendous growth in the use of automobile and truck has brought substantial changes in solutions of these external circulation problems, and if we can adequately predict the continued rate of growth of vehicles in use, perhaps even greater changes are in store for us. Many parts of our towns and cities are now antiquated, principally because they cannot solve their external circulation problems; streets are congested, parking is inadequate, service access is difficult or non-existent, and pedestrian approaches are hazardous and unpleasant.

A whole new vernacular of architectural design has developed, oriented toward the driver's particular attachment for his automobile. Witness the increasing number of drive-in restaurants, motels, drive-in movies, banks, and shops. In Florida, a drive-in church has recently been designed. The orientation of architectural design, urban design, and townscape to demands of the motor vehicle has made some advances, but there is still a long way to go.

A description of some of the projects and analysis of the circulation problems involved, will illustrate the complexity of the problem and why services of a specialist are very important. The work of the traffic engineer must be integrated into an overall appearance that is satisfactory. The primary purpose of streets is to carry traffic efficiently. In addition to doing this job, however, streets also have the potential of creating exciting visual experiences for the driver and passengers. It is the responsibility of the architect, the planner,

and the landscape architect to exploit these possibilities to their fullest, without in any way compromising their function.

One of the more complex types of automobile-oriented developments has been the shopping center.

The modern shopping center is now of age. In the years since the construction of the first large automobile-oriented shopping center, and in the course of preparing drawings for numerous centers, we have learned much about the workings of large retail groups, in terms of creating pleasant and interesting environment and providing for the convenient and safe movement of pedestrian, automobile, and service traffic.

Let us examine some of the principles related to circulation that have proved successful in suburban shopping centers and see how they might possibly be enlarged and improved upon in future developments.

Circulation Principles in Shopping Centers

First, the movement of automobile traffic is carefully planned to provide easy ingress and egress from major streets. Access to the site from existing streets, highways and freeways is an important consideration in site evaluation and selection. Proposed future highway work and its effect upon the property must be carefully assessed. In the plan-development phase, close co-ordination with local and state highway officials with regard to traffic volumes, street widenings, turning movements, signaling, street lighting, etc., is vitally important to the success of the project.

Design of parking lots must provide a continued, uninterrupted flow of vehicular traffic onto the site, unloading facilities, and convenient access to parking areas. Parking should be ample, free, and close to the various facilities. Service vehicles are preferably not intermixed with automobile traffic. In many centers, truck service-tunnels provide completely separate access although they may present financing problems.

Central mall areas are created exclusively for pedestrian traffic, allowing the leisurely, pleasant, and safe movement of the pedestrian shopper. Accessory facilities such as sitting areas, landscape and sculpture, and recreation areas for children are also provided.

The center is scaled to the pedestrian and all shops and stores are within convenient walking distance of each other.

Development of future regional shopping centers will probably be hampered by rising costs of land and the difficulty of acquiring sites of sufficient size close to major highway intersections. In addition, there is the likelihood of even higher requirements for parking areas in relation to selling areas. These factors lead to the conclusion that the decking of parking areas in large shopping centers will become more and more common. Introduction of the third or vertical dimension in circulation patterns, together with the movement of more service and passenger vehicles in and out of smaller sites, indicates that continued co-ordination with traffic engineers, officials, and consultants will be vital.

One possible approach to such a center might be a split level parking system with one parking level approximately four feet below street grade, the other approximately four feet above. The shops and mall would be at the intermediate, or street, level. The advantages would be many: (a) parking capacity for any given site is nearly doubled, (b) automobile access to either parking level is relatively simple with a minimum of ramps, (c) construction costs for parking decks would be minimized since no mechanical ventilation or sprinkling would be required, (d) stairways from either parking level to the shopping level would be only four feet and no discouragement to shoppers.

Planning for Present and Future Needs

Design of the Southland Center in Dallas, Texas, occupying an entire downtown block and containing a forty-two-story office building, a twenty-eight-story Sheraton Hotel with related facilities, and provision for an additional future office tower, has been much concerned with external circulation. Every effort has been made in this project, now under construction, to keep the ground floor as open as possible for the free movement of pedestrian traffic. Large lobbies, landscaped courts and promenades have been provided for this purpose. In addition to curb unloading areas, two sheltered motor lobbies provide entrance to hotel and office towers.

Two ramps from the office tower lobby lead to three lower levels

of parking containing space for 2,500 cars a day. Allowance has been made for taxi standing, while truck service is provided by three off-street loading docks. A new and growing transportation need has been met in this project by including a heliport on the roofdeck of the tower. The tremendous impact anticipated upon surrounding streets from the flow of goods and individuals in and out of this project has been of considerable concern to us. A study of future land development and traffic patterns in the vicinity of Southland Center is now being undertaken.

Involved as the shopping center may seem to the layman, the architect now finds himself faced with problems of even greater complexity. Preparing the master plan for the development of a large project, or a new town or city that will be built up over a ten- or fifteen-year period, requires planning and design standards and a reasonable distribution of land uses based upon economic and statistical analysis. It also requires a tremendous amount of flexibility to be built in so that changes resulting from initial experience, fluctuations in the economy, regional factors, and unforeseen events, can be absorbed in growth with a minimum of negative effect upon existing development.

Preparing master plans for large raw land projects requires careful consideration of many circulation patterns. Through-traffic must be segregated from local traffic as much as possible. This factor involves co-ordination with state highway officials regarding freeway and major highway routing and the location and design of traffic inter-changes. Careful layout of secondary streets takes into consideration the parceling and servicing of adjacent lands, design standards adequate for anticipated future volumes, and topography of the site. Continuity of road network with adjacent properties is of particular importance and should be worked out within the framework of a county or municipal master road plan.

Keen competition in subdivision home sales means continual upgrading of standards, even in excess of those required by local and state law. Better separation of pedestrian and vehicular traffic and more generous recreation facilities, including golf courses, parks, and equestrian and hiking trails—where the nature of the development permits—are amenities that will more than pay their way.

In the commercial and industrial portions of such enterprises, road patterns must be carefully considered, and parking requirements established, not so much in terms of today's needs as in terms of needs anticipated in the future.

Converted Land Use and Future Parking

One of the largest projects ever undertaken by a single client is that contemplated by the 20th Century-Fox Film Corporation to transform their 173-acre studio lot in West Los Angeles into a $400 million commercial and residential development over a ten-year period. (Figures 1 and 2.) In preparing a master plan for this undertaking, we have been particularly concerned with meeting the almost insatiable demand for parking spaces in office building, retail and apartment areas. It is interesting to note that although the site is 173 acres, well over 200 acres of parking have been provided. The following standards were used to determine parking area requirements:

1. Office and professional buildings: one space per 60 percent of office personnel plus future expansion.
2. Shopping center: three-to-one ratio plus expansion for critical shopping periods.
3. Apartments: two spaces per apartment plus guest parking.
4. Hotel and auditorium: one space per room; one space for each two seats in the auditorium plus guest parking.

In addition to adequate terminal facilities, convenient movement from parking areas to destination, and ample access to parking areas, it was believed that the road system within the project offered a means of creating drama and visual excitement.

Because of the unique character of the project, it is expected that many visitors will pass through daily in addition to the persons working, shopping, and residing in the site. Consequently, road design and parking standards are somewhat higher than would be required for similar commercial and residential areas.

As stated earlier, circulation problems imposed by increased use of motor vehicles and rapid population growth have created serious problems for our cities. Contrast the well-designed shopping center, for instance, with the typical downtown of our established cities.

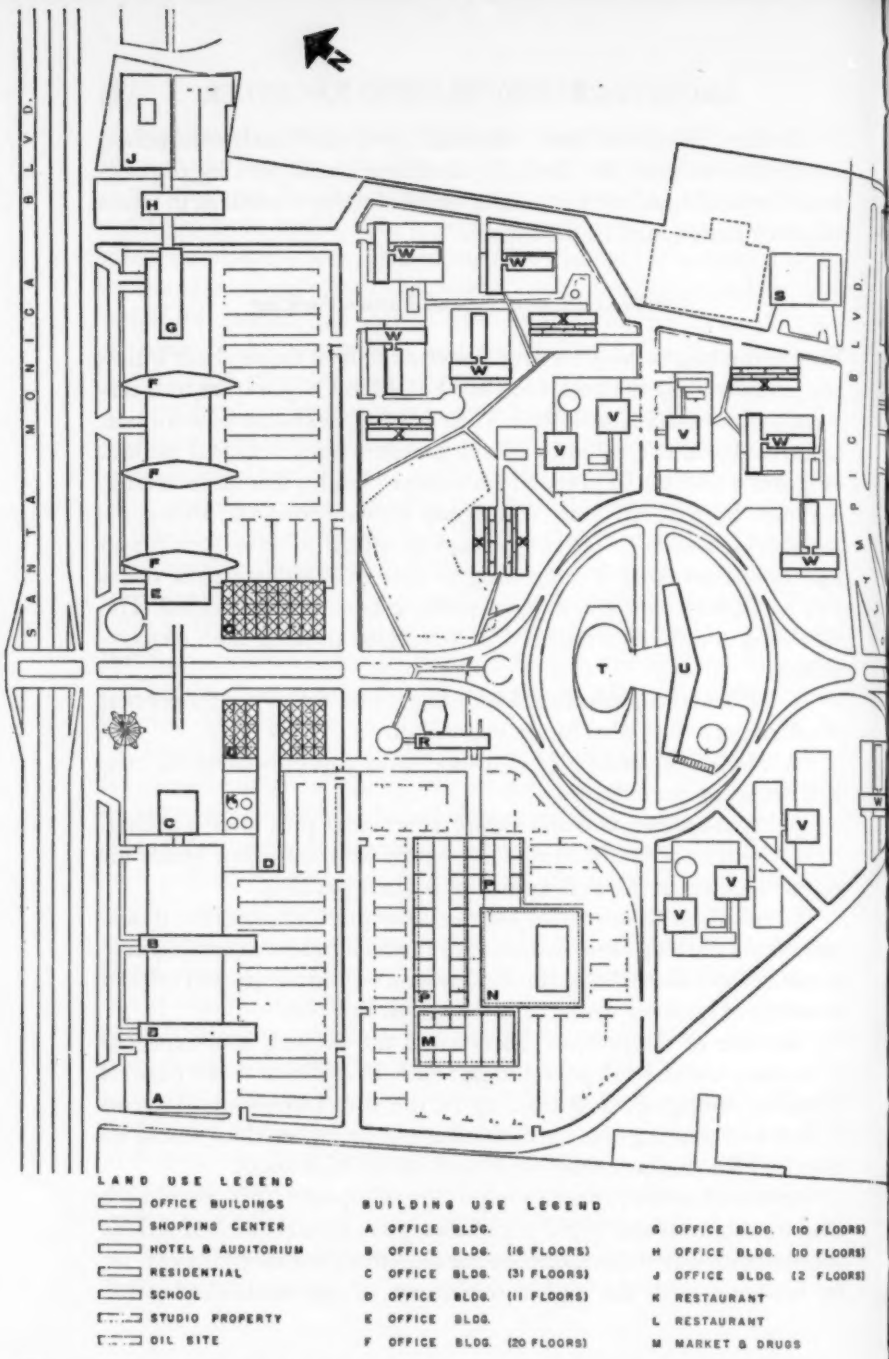
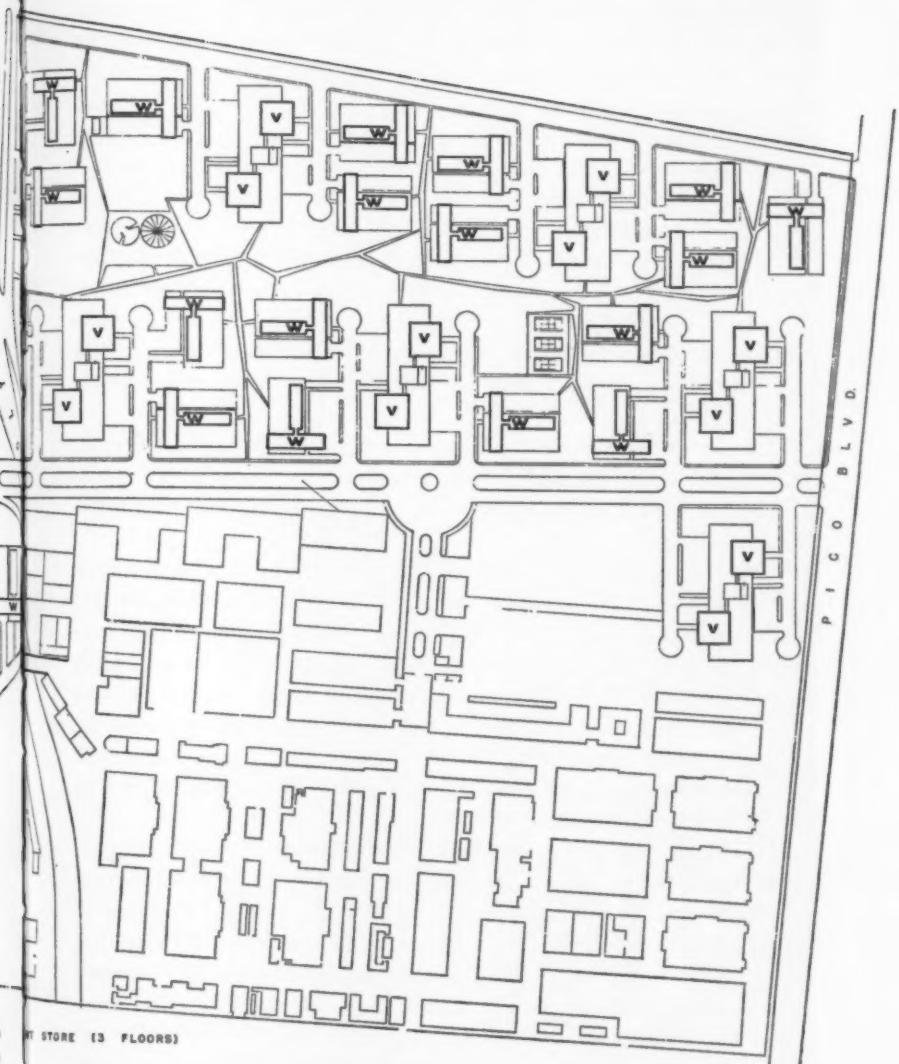


Figure 1. Land and building layout of Century City, Los Angeles, California.



T STORE (3 FLOORS)

NTS CENTER (9 FLOORS)

U HOTEL (21 FLOORS)
V APARTMENTS (20 FLOORS)
W APARTMENTS (8 FLOORS)
X GARDEN APARTMENTS

Welton Becket and Associates, Architects, Planners, Engineers

Downtown streets are often narrow and jammed with through-traffic, local traffic, service trucks, and public transportation. Pedestrians are crowded onto narrow strips of sidewalks, threatened on one side by vehicles, and confused on the other by a hodge-podge of architectural styles, mixed land uses, and conflicting signs. Parking is insufficient, scattered, and jammed into small lots. Service is either off the streets or from hopelessly narrow alleys. This congestion, together with the antiquation of existing structures, poses a serious problem for retail interests in the central business district.

Little wonder that the suburban shopping center has prospered. Yet continued deterioration in turn induces the withdrawal of established tenants and owners to newer or better-maintained areas, and their replacement by less desirable users. The cost of city services for health, welfare, and public safety for these portions of the city, rises to the point where they become tax-deficit areas and a burden to the taxpayer.

The solution to these problems varies for every community. In some areas wholesale demolition and rebuilding are in order, while in others a workable plan can be developed by rehabilitating existing structures.

The city of Riverside, California, is undertaking a program to update its central business district. In preparing a plan for this modernizing, we have been particularly concerned that it be completely feasible with practical steps that can be taken immediately to relieve traffic congestion and improve parking conditions, and yet, at the same time, that it not underestimate the potential of the people of Riverside to bring about major and dramatic changes in downtown land use and circulation patterns in the next fifteen or twenty years.

To achieve both of these objectives, a phased development program provides a step-by-step method of first solving pressing current problems and halting deterioration; then gradually by means of public and private improvements, creating a new central city that can provide for the needs of a doubled population, vastly increased vehicle usage, and far greater amounts of individual leisure time.

Certainly for no community is there an ideal solution. For, in the unlikely event that such a plan were devised, by the time it was accomplished, new problems would have arisen requiring new an-

Figure 2. Architect's model of Century City, Los Angeles, California.

Welton Becket and Associates, Architects, Planners, Engineers

swers. Rather, the answer lies in public agencies' and interested citizens' looking ahead and trying to anticipate and prepare for differences in living habits by means of a continuously changing general plan that is restudied, modified, and updated on an annual basis.

Any examination of the ability of Americans in the past to meet critical problems and overcome them will indicate clearly that we can and will solve these problems now existing in most of our cities, and it will only be in keeping with the American tradition to assume that they will be solved in ways that may seem completely beyond attainment today.

Vertical separation of pedestrian and vehicular traffic by means of raised sidewalks offers a solution in one direction. Such a program is already being given serious study in some cities. Logical amplification of this program would include moving sidewalks and separation of truck traffic, public transportation, and automobiles by means of tunnels and elevated roadways. Selected examples of each of these can be found in operation today.

Solution in another direction involves applying some of the techniques tested and proved in the shopping center to the downtown area. This method would mean elimination of vehicular traffic from certain areas and the creation of safer, more pleasant, and more generous pedestrian areas. Several cities—among them Oxnard, California; Springfield, Oregon; and Waco, Texas—have tested this approach and many dozens of others are considering it seriously. Such a step, however, important as it may be by itself, can only be successful if it is part of an overall program of civic improvement. Otherwise it may benefit a few at the expense of many.

Vital to any solution is the provision of ample and efficient terminal parking facilities. The practice of devoting large downtown areas to surface automobile parking seems grossly inconsistent with land values. Several systems for the vertical storage of automobiles have been developed and are in operation. These must be further refined and others developed. Specialization in the design of parking structures should be given more consideration. The structure used for all-day employee parking certainly has a different set of requirements from the one used by retail shoppers with a turnover in each parking space every thirty minutes.

Dramatic steps can and will be taken to make it possible for the cores of our cities to operate efficiently as the hubs of commerce, finance, culture, and administration. Just as it is important that the new buildings rising in these centers be well designed, so also it is important that the various services to these buildings be correct and that, in addition, careful attention be given to the spaces created between them: the streets, courts, parks, and plazas.

This cursory examination should indicate the architect's wide range of interest in the creation and modification of the environment in which we live. Successful translation of these new concepts into a building, groups of buildings, and implementation of entire master plans, therefore, require the most diligent teamwork by many highly trained individuals.

Expressway and Industrial Location

CHARLES BALL AND MICHAEL TEITZ

Mr. Ball, before becoming Technical Director of the State of Wisconsin Metropolitan Study Commission, was Capital Budget Officer for the City of Madison, Wisconsin.

Mr. Teitz, a native of London, England, is a project leader with the Metropolitan Study Commission.

OBJECTIVES of this article are three: to combine researchers' findings about the impact of expressways on industrial development; to comment tentatively about that impact, and to discuss whether engineers and planners are organized and tooled to make expressways yield maximum secondary benefits.

On the effects of expressways on land-use and industrial investment, we have case studies and monographs of empirical evidence; yet we have no body of theory applicable in a variety of situations. This may prove a costly shortage as engineers and planners confront unprecedented highway construction with few firm notions about effects the new public works will have on metropolitan land-use, on urban area efficiency, and forms and spatial relationships in tomorrow's cities.

Nevertheless, studies of industrial location generally find that the construction of expressways in open country adjacent to urban areas can generate significant amounts of investment in plant and equipment. A study of industrial development in the San Francisco Bay area, for example, reveals that 43.1 percent of recent expenditures in new industrial plants in Alameda County took place in a "freeway-influenced area." This area represents only nine percent of the total industrial acreage in Alameda County.[1] Other studies have demonstrated that industrial land values in areas adjacent to expressways under construction increased three to four times in ordinary cases and several times more in unusual ones.[2] Competi-

1. Frank C. Balfour, "California's Land Economics Studies Along Controlled-Access Highways," XII *Traffic Quarterly* 1 (January 1958), p. 23.

2. Huston Rawls, "New Horizons in Urban Development via the Expressway", XI *Traffic Quarterly* 2 (April 1957), p. 170. William G. Adkins, *Effects of the Dallas Central Expressway on Land Values and Land Use*, (College Station, Texas Transportation Institute, 1957), *passim*.

tion for sites along expressways is keenest at focal points along the roadway—at interchanges of principal routes, near settled areas, and in areas where utility improvements enhance the value of land.

These general findings about land values and aggregate investment, unfortunately, do not carry us very far toward answers to several critical questions: What kind of activities seek a location in an expressway-influenced area? Why do those activities seek that location? What kind of activities do not seek location in an expressway-influenced area? What barriers inhibit industrial development along expressways? To what extent can the opening of expressways influence inter-regional relocation decisions by manufacturers?

A few answers we seek can be found in looking at what happened in the Boston area when Route 128, a highway ringing the Boston metropolitan area, was put in place.

Route 128: Case Study

Since 1949, the Commonwealth of Massachusetts, through a special authority and local governments, spent a billion dollars in limited access highway construction. Most of these funds were spent in the Boston metropolitan area. The system includes a central artery, several radial expressways, a cross-state east-west thru-way, and the circumferential highway, Route 128. (See Figure 1.)

Construction and design standards on these routes were exceptionally high, with limited access controls, grade separations at interchanges, storage lanes, wide center malls, and generous rights-of-way. Except for the Massachusetts Thruway, built by a special authority, the commonwealth's department of public works was in charge of planning and construction.[3]

All routes were part of a single plan to relieve traffic congestion in the eighty-two-community metropolitan Boston area. The plan was published in 1948 by the Joint Board for the Metropolitan Master Highway Plan, a committee bringing together the commonwealth's department of public works, planning board, and metropolitan district commission.

3. Joint Board for the Metropolitan Master Highway Plan, *The Master Highway Plan for the Boston Metropolitan Area* (Boston, 1948), 124 pp., maps and charts. Department of Public Works, *On the Trail of More and Better Highways* (Boston, Commonwealth of Massachusetts, 1955), unpaged. Department of Public Works, *A Three Year Program: Fiscal Years 1955 to 1958* (Boston, Commonwealth of Massachusetts, March 1954), 41 pp.

Work on 128 had begun *before* 1950; yet the route, as we know it today, began to take shape in that year. The road's design called for limited access, with entrance and exit points at separated grades spaced on an average well over a mile apart.

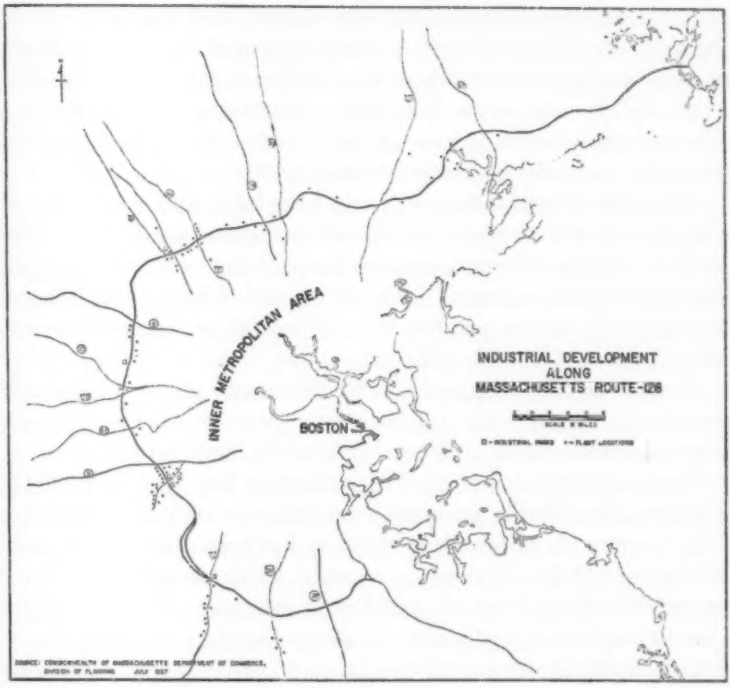


Figure 1

Once Route 128's right-of-way had been announced, industrial land brokers began buying large tracts along the proposed roadway. Towns and cities through which the road was to pass co-operated by zoning large tracts of agricultural land for industrial use. Land values along the route rose from between $50 and $100 an acre to $2,000 to $5,000. More than forty plants costing $100 million were under construction before the route opened.[4] By March, 1957, a total of 141 new plants had been built and twenty-four old ones had been expanded. This construction added 4,962,757 square feet of

4. *Business Week* (May 1, 1955), pp. 186–190.

new plants, and 912,380 square feet of new use in older plants. In all, 11,287 new jobs were created by this expansion.[5]

Of the 141 new plants, opened between March 1954 and March 1957, twenty-eight were formerly situated in Boston; thirty-seven came from Boston's immediate older industrial suburbs—Somerville, Cambridge, Chelsea, Revere, Lynn, and Medford. These communities have long been heavily congested, and before Route 128 was opened, there was little land within the inner-metropolitan area for plant expansions. In addition, thirty-four other new plants were opened for entirely new Massachusetts companies. Only nine of the 165 came from outside Massachusetts.[6]

Although eleven industrial parks have been opened along 128, it appears that most plants are outside organized subdivisions. The heaviest amount of investment was made in the Wellesley-Newton-Needham-Dedham area at the southern end of Route 128. Most of the land in that area is served by public utilities and there are rail connections to the south and west.

Farther north, it seems probable that many plants have had to provide their own water supplies and sewerage systems. Equally important, there is no direct rail link to the south and west.

Recent completion of the Massachusetts Thruway from Boston to Albany, New York, promises to stimulate additional investment along Route 128. Although no estimate has been made of the probable impact of the Thruway, one tract in Framingham near the intersection of the Thruway and Route 128 was platted in 1956 for 9,000,000 square feet of industrial shops. Developers of this site expected a capital investment of one hundred and fifty million dollars.[7]

Among the 165 new or expanded plants on Route 128, at least forty are electronics and research establishments. These have tended to locate in the center and southern sectors of the roadway. They represent the most common activity along the route. The electronics industry, producing a low weight, high value product, depends upon trucking for a great share of its market transport.

Five rubber plants and an even greater number of chemical firms are situated along 128. These firms have special production

5. Massachusetts Department of Commerce, *Area Summary: Industrial Activity On Route 128, March 1954–March 1957* (Boston, Commonwealth of Massachusetts, 1957), p. 1.

6. *Ibid., passim.*

7. *Christian Science Monitor* (Atlantic Edition), January 18, 1956.

and plant layout requirements that make an open site, rather than an older factory building, attractive, if not necessary. Also common along 128 are publishing houses, food-distributing firms, lumber and building material warehouses, and new regional assembly plants of national producers of hard goods, such as automobile makers.

Despite the intensity of industrial development along 128, ample land remains for future expansion and new construction. Residential uses have not encroached upon the roadway, nor has strip commercial development been permitted.[8]

Preservation of lands along Route 128 for industrial use does not stem from extraordinary efforts by the department of public works, or any other agency of the commonwealth. No land was sold by the commonwealth to industrial developers. Site preservation appears to be the result of a number of circumstances:

1. The roadway's design tends to stimulate industrial rather than residential construction. Since access points are spaced far apart, and the right-of-way is unusually wide, Route 128 has few advantages to the residential subdivider, particularly when more convenient open sites exist nearer Boston along radial expressways.

2. Town and city officials were quick to preserve industrial sites through zoning once 128's route was announced. This action was no doubt motivated by a desire to broaden suburban tax bases to include more industrial properties.

3. Most of Boston's suburban communities are old places with charters which often date back to the 17th Century. Residential development has been slow, usually moving in an orderly fashion from town commons and settled areas. Few large subdivisions have been platted in the area, and there is no development comparable to the sprawl that characterizes fringe areas around California metropolitan areas.

4. When Route 128 was opened, industry was starved for new land and leaped at the open spaces made accessible by the new road.

Milwaukee's Experience

Elements of the development along Route 128 are found in the Milwaukee area along Highway 100, a north-south road which has

8. The only commercial activities allowed are gasoline stations and restaurants in leased quarters owned by the Commonwealth.

been widened to accommodate circumferential traffic seeking to by-pass the City. Highway 100 has few design characteristics in common with Route 128. Lanes are separated for only a portion of the route, the road passes through settled areas, and has few sections under access control.

Nevertheless, the tendencies of certain industrial and commercial activities to seek a suburban location along a rapid motor transport route have been operative. Peculiar to Highway 100 is the location of commission warehouses and food-distributing firms with markets in suburban shopping centers and construction material warehouses and sales yards.

This tendency of warehousing to follow deconcentration of retailing to suburbia will no doubt reduce the importance of the central business district in warehousing, heretofore one of its principal functions.

Despite this movement of warehousing investment to suburban locations along Highway 100, the pressures stimulating deconcentration in Milwaukee have not been as pronounced there as in the Boston area. There appear to be several reasons:

Although Highway 100 could have been the scene for industrial development, sites were not protected against residential and commercial encroachment by local zoning authorities. The demand for land by residential uses in the area preceded the demand of industrial use.

In this market situation, unless some sites are conserved, industry is unable to secure raw land in expressway influenced areas when needs arise. Failure to control access, and the tolerance of minor traffic generators helped reduce the usefulness of the road to industrial and heavy commercial activities.

Milwaukee, unlike Boston, is a major producer of heavy capital goods. Most of its industries are large establishments which process heavy materials. They have decided advantages in a central location since they depend heavily on rail and water transport. The capital goods producers do not relocate as easily as the light manufacturers, since their undepreciated investment in the older plants is enormous.

Milwaukee, unlike Boston, has had excess plant capacity and a relatively depressed industrial land market through much of the post-war period.

To this point, we have concerned ourselves with two case studies

of industrial and heavy commercial development in expressway influenced areas. Such studies should be the primary material for the formulation of more general propositions which can be valuable in guiding future growth to yield socially and economically desirable secondary benefits from expressway construction.

While theorization at a sophisticated level is, at this stage, difficult, perhaps impossible, we can draw conclusions as to what type of activity will typically locate in an intimate relationship to the expressway, and to put forward some tentative hypotheses as to the causal mechanisms which are operative.

Generalizations

Certain groups of activities appear to seek locations in the suburban areas adjacent to expressways. The movement of these groups to the expressway-suburban area is most pronounced when the road system includes a circumferential highway intersected by radial highways from the central area. A list of the more obvious activities seeking the expressway-suburban location would include:[9]

1. Activities that rely exclusively on truck transport, commonly those producing a low weight, high-value product for sale in a metropolitan or regional market, seek the expressway-suburban location. Electronics equipment producers fall in this group.

2. Manufacturies that, because of their production organization, require large land areas often can find land only in areas opened to development by construction of an expressway. Such manufacturies will typically be organized for single level, straight line production.

3. Manufacturies that have outgrown their central city breeding ground and which require new sites to meet requirements for production flexibility, but which must continue to depend on central area contacts for much of their trading often seek an expressway location if it insures them easy access to the central area. Printing firms are a good example in this group.

4. The branch plant involved in inter-regional location movements will usually seek new ground in suburban-expressway areas

9. The definition of activity groups by no means suggests that the categories are mutually exclusive.

rather than in the central area. The expressway location gives convenient access to both the regional and metropolitan markets.

5. Heavy commercial firms, such as commission warehouses and wholesale firms, whose markets have moved to suburban areas in the shopping centers, have tended to seek suburban-expressway locations.

Although this classification is not the only logical one, it identifies principal characteristics of industries that seek expressway locations. One new feature appearing is the extension of consideration from purely industrial activities to a closely related class, the heavy commercial wholesale establishments which carry their own stocks and distribute to a wide area. There is evidence that this latter group is significantly large when compared with the former, although it may well be that the motives for its locational decisions differ radically. In the case of industries seeking an expressway location, the movement is land-oriented. In the case of heavy commercial activities, the movement appears to be primarily market-oriented.

Quite apart from these movements, the Milwaukee experience demonstrates that certain kinds of activities will not seek a suburban location in expressway areas. Included here are:

Heavy capital goods industries with large undepreciated investments in plant; industries that depend upon water and rail transport, principally the traders in and producers of heavy, bulk capital goods; service activities that depend on direct ties with the central business district, and heavy commercial activities that distribute to firms in the central business district.

Reasons for the investment of industry and commerce to expressway locations can be partially identified in the very character of the activities themselves. All of the types cited commonly require considerable areas of space for their operations, and, in many cases, also require specially designed facilities for most efficient production. Such a requirement, at a time when the multiple level factory has declined radically in the eyes of industrial plant designers, must lead to a demand for raw land.

Yet land is not a homogeneous commodity; its value will vary with the status of its relationship to all other land as well as its physical character. The greater the number of potential uses to which it can be put—this reflecting in a highly integrated industrial

economy its accessibility—the greater will be the number of competing uses which will bid to occupy it.

Industrial and commercial activities of the types indicated are in an intimate relationship with the total economy of the area in which they are located and for which they produce or distribute. In the metropolitan community they are linked to a whole network of complementary productive and service activities. This relationship requires that they keep in economically close—rather than physically close—contact with both the central business district and outlying distribution centers. They are competitors for land which will insure that close contact. It is this necessity for contact which logically drives them to the expressway location, for the expressway has so changed the locational character of the land through which it passes as to make its use feasible for the first time.

Even if vacant land should exist in the central area, its increased cost will render its use by low density activities uneconomic in a highly competitive market if such activities must compete with firms having an advantage in land costs through their location in suburban areas. Under these conditions the creation of a whole new area of prime industrial land by opening of an expressway should result in an immediate and explosive spatial expansion by industry.

This appears to have occurred in Boston. Even if these conditions should not exist in the urgent form of the example, the creation of new land should be a significant element in the slower, long run growth of the city's industrial base.

So far most of our concern has been with the demand for a particular factor of production, namely land. Relatively little consideration has been given to the influence of the market, except as the necessity to maintain economic contact with it is vital for the use of land by industry and commerce.

The growth of metropolitan areas results in a significant change in the market situation. Population and purchasing power move to outlying areas and changing patterns of behavior in buying evolve. In association with these, much retailing is relocated into concentrated centers in peripheral locations.

This entails a shift in a major portion of the market of the commercial distribution and storage facilities formerly located in or near the central business district. Resultant upon such a shift, and

upon the creation of an expressway system, a new pattern of distribution costs will emerge.

In diagram form, the new situation can be formulated in the following way: Assume a theoretical circular city form with increasing local street and traffic density toward the center, upon which is superimposed a system of expressways consisting of two radials and a ring highway. (Figure 2.) Lines of equal cost of dis-

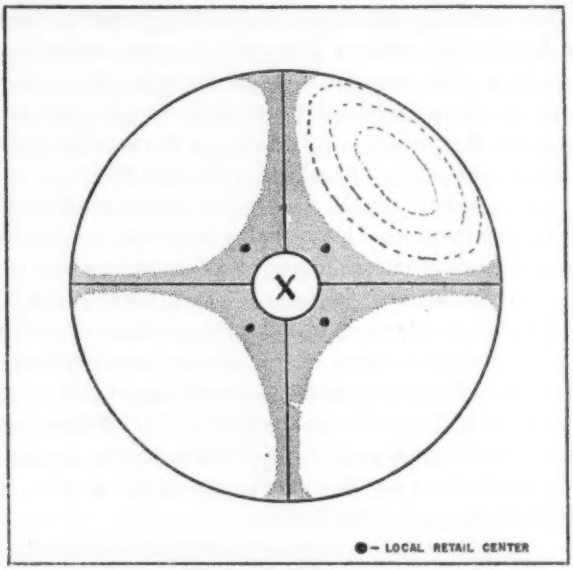


Figure 2

tribution can be drawn for a center at X. The area within the line of maximum advantage from the center will take a form approximating to that shaded in Figure 2.

Center X is admirably situated to serve the central business district and minor distribution centers relatively near the center—for which purpose it was originally located. However, it is not efficiently located to serve new centers of retail distribution located on the outer edge of the metropolitan area in the unshaded sectors.

On the other hand, a distributor located at Y in Figure 3 will be working with a spatial maximum advantage system taking the

shape shown in the shaded area. Being situated at the intersection of the ring highway and one of the radials, the contact the distributor will retain with the central business district will be easy and cheap. Although not easily able to serve the inlying local shopping districts, he will be very efficiently situated with respect to the newly rising outlying foci that are, for the most part, well within his area of competitive advantage.

The greater total area of land covered by the cost area in the second diagram is justified, when that outside the ring is included, on two grounds:

The density of streets and traffic in the outer areas is less than in the core, giving a larger area of accessibility off the expressway at equal cost.

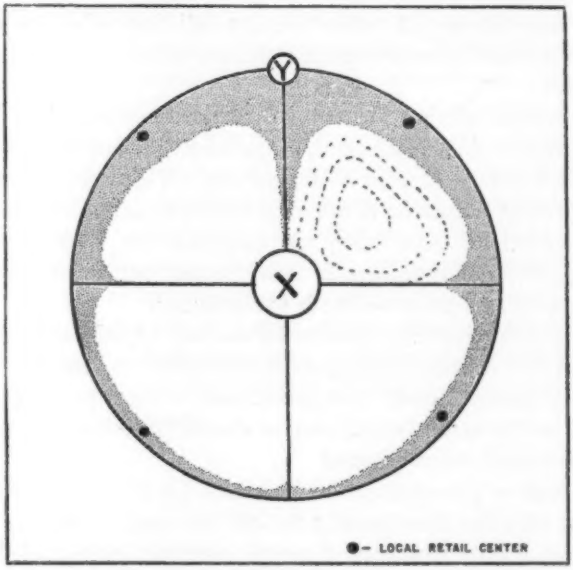


Figure 3

The overhead costs of the outlying location, as reflected in the service charges of the land involved, will be lower. In consequence, the margin allowable to distribution costs should be greater for the outlying distributor than for the inlying distributor.

If these diagrams are valid descriptions of the area cost patterns involved, there should occur some movement of commission warehousing and distribution facilities outward from the old areas around the central business district to a new point of minimum cost. The possibility of such a relocation taking place will further be dependent upon the amount of fixed capital tied up in the downtown facilities, as well as upon in-city traffic intensity. Once the cost of liquidating an inlying location is outweighed by the advantages of an outlying location some relocation is inevitable if land in a suitable situation is available.

The Need For Tools

The extent to which metropolitan regions reap maximum secondary benefits through development of properly organized industrial areas in their expressway influenced sectors will depend upon far more than the natural pressures toward deconcentration of industry and commerce.

Residential uses tend to move to outlying areas before industry and commerce. If unrestrained, the residential demand can remove raw lands from the market well in advance of industrial movement, thus depriving industries of open areas and making the competitive advantages of an expressway site unattainable. This tendency is often aggravated by failure of local zoning authorities to control development and preserve lands for industry.

Competition between residential and industrial-heavy commercial uses raises an interesting question of values: should the ordinary market forces be allowed to operate even though prime industrial sites will be lost to residential uses, or should large tracts be withheld from residential development?

The logic of governmental intervention is compelling when one considers that the investment a society has made in an expressway can be more fully recouped through intensive industrial development.

Part of the failure to preserve lands for industry can be blamed on lack of an organization that can take a comprehensive view of a metropolitan region and plan the proper relationships between land use, industrial development, and expressway construction. The organizational void has been made all the worse by frequent failure

of expressway planners and land use planners to communicate with one another.

Fortunately, state legislatures throughout the nation are creating mechanisms which can be used for planning across whole metropolitan regions. Thirty-three states have passed regional planning statutes which permit the organization of agencies competent to plan expressways and land use. Of these, eleven states have enacted their statutes since 1951 and nine others have made substantial revisions in older statutes.[10]

Among these statutes, the Oklahoma law is most sensitive to the need for land use planning along expressways, since it gives to regional planning agencies authoritative zoning powers within a quarter of a mile of all state and national highways.[11]

The organizations that can be treated under these statutes permit the development of agencies which can seek to derive the maximum in secondary benefits from expressways. Whether they will, in fact, produce that which is sought will depend upon how closely the agencies integrate the work of expressway and land use planners.

Although it may seem like tub-thumping an old tune, protection of expressways from minor traffic movements, control of sprawl, and optimum industrial development require this communication at the planning level. Should such a working relationship exist, expressways can effectively channel intra-regional investment into areas which will grant maximum competitive advantage.

Over the longer run, if a high degree of intra-regional investment can be stimulated, there is no question that investment from outside the region can be attracted by the growing markets of a metropolitan community.

10. Charles Ball, *Report on Regional Planning Legislation* (Milwaukee, Metropolitan Study Commission, 1958), pp. 10–26.

11. Oklahoma house bill 905, approved May 31, 1957.

The Car and College Campus

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THE phenomenal growth of institutions of higher education is creating an acute traffic and parking problem on hundreds of campuses. Daily patterns of pedestrian and motor car travel include Professor Smith's preoccupied walk from home to his morning classroom on campus, the administrative and services staff, students from dormitories and across the college town, and those who commute fifty miles or less by bus or personal car.

When the volume of people converging on the campus at certain morning hours is great enough to obstruct the orderly and peaceful movement of each person concerned, a traffic problem arises. Since the rate of speed is rarely high the loss of life or limb is small. The loss of time is great.

Traditionally, academic life has been thought leisurely and spacious; the scene, on the whole, underpopulated except on Saturday afternoons in autumn. Within the last few years, however, a marked change has become apparent.

Economic prosperity, population growth, and the democratization of higher education support more than twelve hundred senior colleges or universities—more than forty of them having at least ten thousand students. Several of these have more than thirty thousand, and more than sixty others have enrollments between five and ten thousand.

Each such institution has to be considered outside its gates in the traffic surveys and regulations of its locality. Higher education today is big business; its personnel highly mobile on streets and highways as well as on the campus. Unforeseen but inescapable, the great ex-

pansion of college facilities is bringing functional as well as ideological changes. To be reasonably efficient, colleges and universities must come to terms with modern transportation.

The act of entering college, like one's christening or marriage, used to be considered a landmark along life's journey. The physical act of "going" normally involved a railroad trip. Today, entering college is an interesting but, after all, only a normal change of base. The freshman of the class of 1962 has since infancy traveled with his family or, now in his teens, with his contemporaries.

He has quite probably traversed the United States and has no doubt seen several campuses, including the one he is to enter. He may have seen military service; he may be married. Living at home has not been physically or socially restrictive; he does not expect college to be. The freshman would doubtless prefer that his college residence be away from home; but whether at home or in a college dormitory he will expect to be in and out away from the campus, not there for a semester's stay.

The student who comes to the campus by bicycle from ten blocks away, as thousands do; or commutes by personal car from fifteen miles away, as thousands do; or even thirty miles away, as hundreds do; or who keeps a car just off campus, as hundreds do, is not likely to think of the college experience as a period of withdrawal from his normal life to academic seclusion. The automobile is changing the face of the campus and the character of the college town. Whether the resident student lives in a dormitory, a college club, or a rooming house, he will, if permitted, have his car at the door; his environment ranging over perhaps one hundred and fifty miles, as it would if he were at home.

When the first automobile—perhaps a red Stutz Bearcat—appeared on a campus some forty years ago, it was an event, like an out-sized dog, something to be tolerated by the faculty, envied by the student body. As the years went by, student trunks were not heaped quite as high around the college town railroad station in September and at vacation times.

The pre-Christmas special vacation trains to New York and Chicago year by year ran fewer sections. More students came to college by family car in September, and left by the same means in June for the long vacation. The number of student-owned cars in-

creased. With the influx of war veterans, more mature and often married, the composition and attitudes of the campus population became less collegiate year by year.

Finding a Place to Park

Early in the 1958 fall semester, on streets and squares adjacent to a thousand campuses across the United States, tens of thousands of students will enter college grounds. A substantial proportion of each of these throngs at the gates will have arrived a few minutes before by personal car. The goal of each individual is an eight o'clock class.

Some are commuters who have come distances up to fifty miles through the vicissitudes of morning traffic, and weather; the majority will have come less than ten miles. From five miles out their cars have added perceptibly to the incoming traffic; within a five-mile radius they have helped clog traffic-light intersections since seven-thirty.

At eight o'clock, having hit their target of approximately five-blocks' radius centering on the main entrance or entrances to the campus, the drivers begin a spirited deployment along the streets of nearby city blocks in search of a parking place. There will be no free vacant lots at hand nor will there be spaces along the curb within half a mile.

Actually the problem was most acute when college opened in September; then, for a week, there was utter confusion. Now, two weeks later, the prudent commuter has come to terms with his individual problem and has found a tolerable solution. Depending on temperament, he has bargained for daily car storage space in a fairly convenient lot or, more sporting, he has adopted a driving schedule that brings him into town early enough so that he can hope to find an open, free space along the curb within six or eight blocks from the campus.

Here his prospects are not more than fair since, just before seven-thirty, the service employees of the university, whose working-hour schedules have brought them in at that time, have taken such free curb parking as exists for the whole neighborhood. The eight o'clock faculty or student commuter has the range of what is left.

If the situation on a given day is bad he will be late at class. If

through the semester the student misses no more than five minutes three times a week of his nine o'clock lecture or recitation in a three-hour credit course, the course over that semester will in effect have been shortened by more than a week.

Students are naturally resentful that neither the university nor the town provides them with parking. The student owner thinks that his car, like his topcoat in winter, is a personal necessity, and therefore is entitled to standing space. On its side the university is in most instances hard pressed for space, while the citizens of college towns resent the bumper-to-bumper parking that, if allowed, will line both sides of the streets for many blocks for five days each week. Students in residence for the semester will add to the congestion by leaving their cars at the curb inert except for weekends and the college vacations.

Most universities hesitate to assume responsibility for these cars, either socially or physically. In the very few instances where a campus has practically unlimited acreage, open space is likely to lie in one direction—countryward—remote beyond ready access, appropriate only as dead storage for the semester. There have been various compromise arrangements of such space, rarely at all comparable to those of industrial plants where parking accompanies employment.

The problem of faculty parking is complicated by the fact that the individual has academic status. To the majority of the faculty a charge for the privilege of parking on the campus is offensive in principle, a shabby evasion of what should be a normal courtesy to a professional man whose contribution to the institution is beyond that of a mere employee, and whose modest salary should not be reduced by a parking permit charge. An appreciable number are able and willing to walk to and from the campus, always provided that it is at the individual's option, for he has a personal car.

Problems of High Enrollment

High enrollments on a large campus raise critical problems of operation. The throng of students arriving at our thousand campuses on the morning of October 6, 1958 at eight o'clock will go forward along the campus walks. Though students do not openly hurry along

at such a time, every individual in the scene is due at a class within ten minutes.

Groups of from thirty students for a freshman English section, to three hundred for a sophomore lecture in economics, screen themselves out of the main currents. Dozens of classrooms await them, each assigned for the hour to a particular section in one of a thousand scheduled courses from freshman to graduate level. Subject mainly to the laws of chance, Jack Brown's nine o'clock class on Monday, Wednesday, and Friday will be in the first building on the right as he arrives on campus, or it could be a quarter of a mile away by the shortest diagonal path. All this transpires, let us say, at the University of Michigan, or the Ohio State University. As the earth turns, the same processions will form, march, and deploy at the Universities of Iowa and Minnesota, Montana and Idaho, and Oregon and California.

With unconscious spontaneity each professor will begin to speak to his class at ten minutes after eight. In some institutions a hallway gong system sounds twice—the first bell on the hour; the second ten minutes later. At nine o'clock when the first bell sounds, one or two or five thousand students, each briefly an individual, will leave the room he occupied for his eight o'clock, moving to another subject listed for nine o'clock. This situation can exist almost anywhere on any campus within the practically infinite variety of college semester schedules.

Such an interchange will occur again at ten and eleven o'clock, and after lunch, throughout the afternoon. With each such shift each student will travel perhaps sixty feet to the next room in the same structure, up to one thousand feet to another building, assuming always that the trip can be made in less than ten minutes. It could occur that a student is assigned to three successive classes in the same room but this is unlikely.

There is the matter of substantial intramural distances. The University of Michigan uses University buses from the central campus to outlying units. The University of Minnesota has for some years taken advantage of public transportation lines between the Minneapolis and St. Paul campuses. More than one university has provided bus transportation between campus centers and open university parking lots a half-mile or more away. On some campuses

the distances are too great to permit the scheduling of classes hour after hour.

It must also be remembered that the movement from class to successive class is not a treadmill. Students enter and leave the campus at varying times, and spend odd hours in libraries, the student union, at special lectures, or sports and games. Left to himself, the typical student would try to drive directly to his first classroom building, park near the main door, drive to the next classroom address, and so throughout the day on campus. Lack of space makes this impossible.

The university's position on parking usually has to be one of compromise. On the majority of established campuses there cannot reasonably be provided a free parking space for each staff member. The compromises are mainly based on an academic ranking order, with the president and chief administrators at the top, and the instructors at the bottom.

In some cases, a small percentage of students will be included as the lowest grade. College parking has to deal with three problems: the daily storage of student commuter cars on or near the campus; semester parking accommodations for resident students—those living in dormitories, fraternities, faculty homes, or rooming houses; and the pedestrian and automobile travel across a large campus in the course of normal scheduled activities.

The University of Minnesota, situated in a city of more than 500,000 people, may be noted as a large institution where the parking problem is constructively dealt with. The parking arrangements on campus are very considerable in the number of spaces provided, of necessity differing in convenience.

Everyone who uses a car pays for parking with the customer charge varying according to distance from the center of campus. The stalls in the parking garages under Coffman Hall, Northrup Auditorium, Mayo Memorial and the Continuations Center are highly prized. Prized also is a limited percentage of the spaces allocated to students.

Underground garages and the groups of surface lots most convenient to academic and administrative activities are strictly supervised. Certain large lots, away from the main campus, at a lower level by the river, or north of the railroad trackage, rent at ten cents

per day. Except briefly in the morning there is no attendant at the remote lots and therefore no supervision. The facilities, though still inadequate to the total customer demand, apparently strike a balance between the individual's willingness to walk and his ability to pay.

The University of Michigan is a large university in a college town of fewer than 50,000 inhabitants. The old main campus is substantially contained by the city. On the main campus, several parking lots were eliminated by building construction; others will disappear when projected additions are made. A five-level parking ramp situated on the east edge of the campus is in operation. At least three others can be added at suitable locations on the perimeter of the old campus, as demand justifies.

The Medical Center north of the main campus on a moderately spacious site has its own extensive parking system with special lots for various staff groups, for the out-patient clinic, for the maternity hospital, and for visitors. Some of these lots are terraced on the hillside below the compact central complex of highrise buildings. The fact that the facilities include a state hospital in part explains the size of the parking area provided. Patients and relatives who drive from Detroit, forty miles away, or from across the state, expect ready accommodation on arrival in Ann Arbor.

The new North Campus, though annexed by the city and partly occupied by engineering and research units and graduate apartments, is to some extent open acreage. Parking is a built-in facility for teaching and research units, and for graduate apartment areas.

Across the entire campus, staff members pay for parking under a permit system for daytime use. Student parking is closely restricted. A few blocks of campus street frontage and some outlying lots in the Medical Center are free.

Some large unpaved lots on outlying university property have been made available for the storage of student cars. Wherever city or university parking demand is heavy the streets are metered. University lots are patrolled by the city police department. As at Minnesota, the amount of parking provided is less than would be filled if faculty parking were free.

The college administrator of 1959 is deep in the problems of accommodating high enrollments and expanding curricula to the restricted facilities of his campus. In addition he has to look beyond

current needs to the prospects for 1960 and 1970, for the first gentle but ominous swells of the impending tidal wave of college students will soon begin to roll in.

Operating at capacity, the colleges and universities are feverishly beginning to acquire additions to campus, and to plan and construct buildings. The crop of freshmen who will enter college in 1960, and those who will follow in successive annual waves for at least a decade, are already born and beginning to advance through the nation's school systems toward the colleges and universities. The first echelons will appear before the new buildings to accommodate them can be completed.

Today it is the dilemma of the campus site planner that, while changes in educational objectives are under lively consideration, their nature and direction are inscrutable. Possible revisions in the mechanics of the art of teaching are discussed, but not settled. In the meantime plans have to go forward to meet the situations of 1958, the probabilities of 1960, and the possibilities of 1970. Fortunately some factors are tangible even if lacking in clear definition.

The optimum size of a university is not a new problem but it becomes more acute now because of sheer numbers of students. Techniques and standards, student-teacher ratios, and possible mass production of college graduates are topics of the times. The small college will no doubt maintain its important place in the scene but the creation of enough new, deliberately small colleges to meet the demand for adequate facilities over the next decade seems unlikely.

At the other end of the scale, the super-university may, like the dinosaur, become inoperable, its product taking on an uneven quality. Between these limits of physical size, hundreds of colleges and universities will be replanned and greatly enlarged. Perhaps as many institutions will be newly established. The average size may accommodate from fifteen to twenty thousand students.

The urbanization of our population increasingly affects campus site design. As college becomes a normal experience for more American youth, proximity to the student's home neighborhood measured in travel time is increasingly taken for granted. As we have seen, the car as transportation has facilitated the expansion of each campus at the same time causing severe growing pains by the fact of its physical bulk at rest and in motion.

Urban universities for the most part have to accept tightly cir-

cumscribed site areas. The institution whose jurisdiction is bounded by an hour's run by car or public transportation can expand horizontally only by high land coverage or vertically by high-rise college buildings; in either case preferably serviced by drives below grade.

Parking structures incorporated with other campus buildings should operate in direct relation to city streets. The student arriving by car will park as does the professional or business man downtown. He will proceed on foot to his classes using university plazas, walks at various levels, escalators, and elevators.

On a campus of more than 200 acres, horizontal development will be economical and it can be convenient in use if properly designed. For those who cannot be provided with convenient parking on campus, intramural movement can be facilitated by university shuttle buses linked with the campus gateways and outlying parking lots, as well as college buildings.

As an alternate, where the campus is ample for the enrollment, the site plan can be designed as an assembly of colleges or schools: liberal arts, engineering, law, agriculture, and others, each provided with adequate parking lots. Faculty or students can drive anywhere on the campus.

New facilities for higher education are of engrossing interest to the college administrator and the planner. Their efforts are needed for youth will increasingly claim education as its right. Attitudes will be dynamic rather than static, with the campus an intellectual center but not a retreat from everyday life. By car, helicopter, rocket or other means, increasing numbers of students will go to college.

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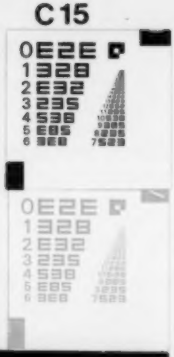
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